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## *Squamocoris* Knight and *Ramentomiris*, New Genus (Heteroptera: Miridae: Orthotylinae). A Cladistic Analysis and Description of Seven New Species from Mexico and the Western United States

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### ABSTRACT

The plant bug genus *Squamocoris* Knight, is revised, including five new species (*fumosus*, *latisquamus*, *pallidinervus*, *purshiae*, *schaffneri*) from Mexico and the western United States. The new genus *Ramentomiris* is diagnosed and described, including two new species, *baja* and *loreto*, from

Baja California, Mexico. The habitus and male genitalia of all species are illustrated. *Squamocoris* is compared to its sister genus *Ramentomiris* and a cladistic analysis is presented for *Squamocoris* species using five related genera of Orthotylini for outgroup comparison.

### INTRODUCTION

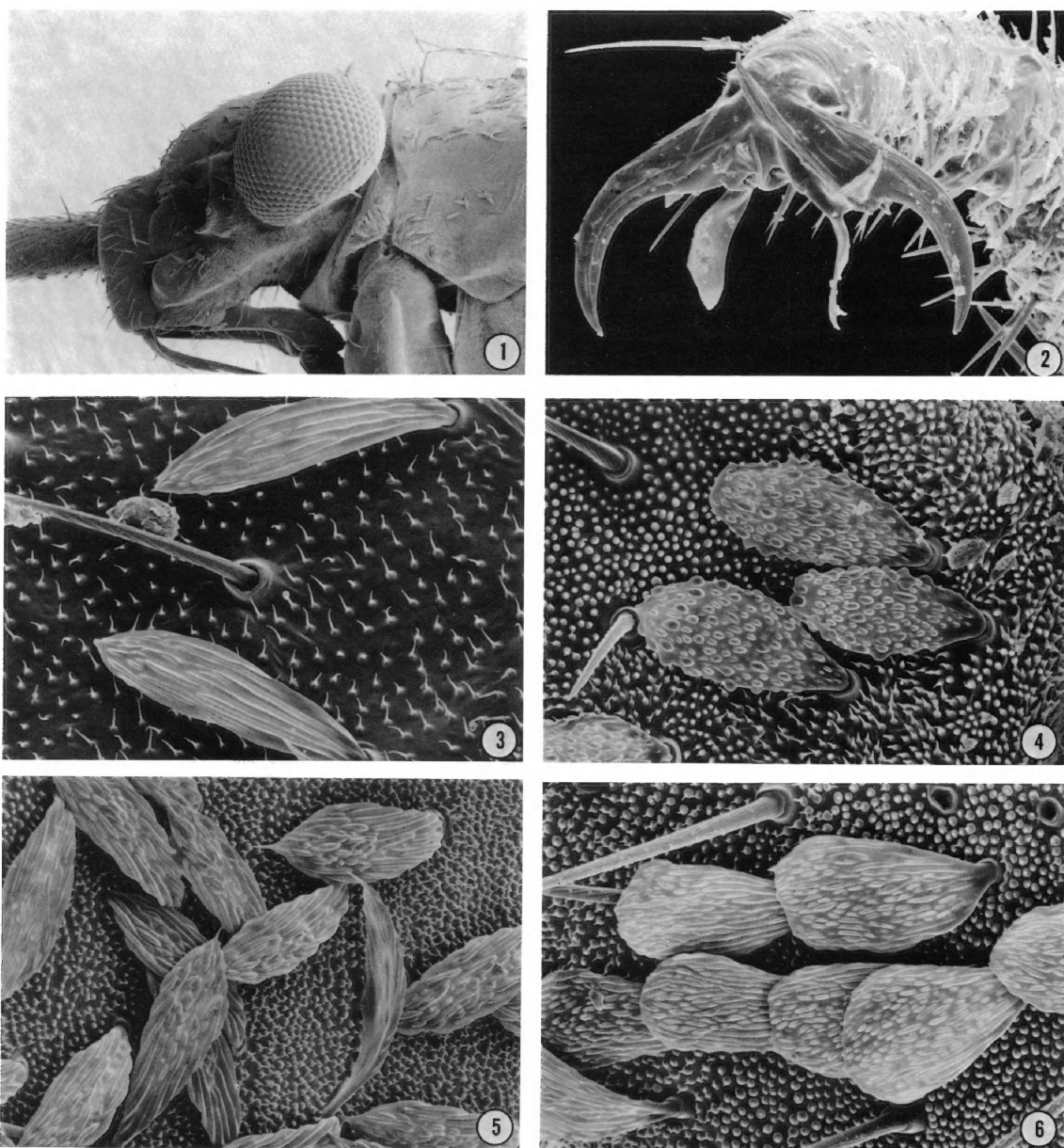
Knight (1968) described *Squamocoris* to receive two new species, *arizonae* and *utahensis*, neither of which had known host plant associations. Subsequent collecting in the United States and Mexico has revealed five

new species of *Squamocoris* and considerable host plant data, as well as two new species of a new genus, *Ramentomiris*, which we believe is the sister group of *Squamocoris*.

All measurements are in millimeters. Ab-

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Figs. 1-6. *Squamocoris* species. 1. *schaffneri*, lateral view of head. 2. *latisquamus*, frontal view of pretarsus. 3-6. Simple and scalelike setae on dorsum. 3. *arizonae*, dark scalelike setae. 4. *latisquamus*, white scalelike setae. 5. *schaffneri*, white scalelike setae. 6. *utahensis*, white scalelike setae.

breviations used in locality data for specimen depositories correspond to institutions listed in the acknowledgments.

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## SYSTEMATICS

### *SQUAMOCORIS* KNIGHT

*Squamocoris* Knight, 1968, p. 108.

**DIAGNOSIS:** Recognized by the elongate parallel-sided hemelytra of the male; strongly brachypterous female; elongate horizontal head with prominent tylus (fig. 1), flat or weakly convex frons, large antennal fossae (fig. 1), and swollen lora; long, thick first antennal segment; broad scalelike setae with parallel ridges, sometimes breaking into pustules (figs. 3–6); head, pronotum, and scutellum usually with longitudinal rows of silvery white scalelike setae; and by the structure of the male genitalia, especially the vesica with

two distally branched spiculae, and phallosome with deep notch on right basal margin.

**REDESCRIPTION:** MACROPTEROUS MALE. Moderate to large elongate body form; length (tip of tylus to apices of hemelytra) 4.91–8.03; width (across humeral angles of pronotum) 1.09–1.58; coloration variable, uniformly pale or lightly to extensively mottled or suffused with fuscous, sometimes entirely dark brown to nearly black; dorsal vestiture with broad silvery white scalelike setae and short suberect simple setae, some species also with broad scalelike dark setae, or occasionally with long dark bristlelike setae mostly on scutellum and along veins of clavus and corium; some silvery white scalelike setae usually arranged in longitudinal rows on head, pronotum, and scutellum. **HEAD.** Figure 1. Elongate, horizontal, posterior margin without elevated carina; tylus very prominent; frons flat or slightly convex, weakly or moderately sloping, merging with tylus along broad shallow depression; vertex broad, transversely flattened or weakly sloping anteriorly; eyes prominent, subovate, slightly to moderately projecting beyond anterolateral angles of pronotum in dorsal view, occupying from one-half to nearly two-thirds of head height in lateral view, posterior margin slightly removed from anterior margin of pronotum; antennal fossae large, occupying approximately one-half of eye height in lateral view, slightly removed from anterior margin of eye; antennae inserted near ventral margin of eye, segment I stout, weakly bowed, usually slightly thicker medially, length slightly less than width of head across eyes in dorsal view, with several erect bristlelike setae dorsally and laterally; segments II–IV cylindrical, linear, much narrower than segment I; all segments with short reclining simple setae; lora distinctly swollen (fig. 1); genae broad, width equal to or greater than diameter of antennal segment I; buccal flange nearly reaching posterior margin of head; gula narrow or obsolete; labium reaching between mesocoxae or slightly beyond apices of metacoxae. **PRONOTUM.** Trapezoidal, broader than long, slightly to moderately sloping anteriorly, with narrow flattened collar; lateral margins sometimes weakly to moderately carinate, more strongly so anteriorly; posterior and lateral margins straight or slightly ar-

cuate; anterior margin weakly sinuate; posterior angles broadly rounded; anterior angles rounded, or angulate and ridgelike; calli weakly to moderately convex, reaching lateral margins of pronotum or nearly so, bordered posteriorly and sometimes medially by shallow depression, sometimes appearing continuous medially; mesoscutum broadly exposed; scutellum weakly to moderately arched, anteromedial region sometimes transversely flattened. **HEMELYTRA.** Elongate, parallel-sided, claval and radial veins sometimes weakly elevated, cuneal incisure shallow, cuneal fracture transverse or angled slightly anteriorly, cuneus much longer than broad; membrane lightly to moderately suffused with fuscous, sometimes with faint mottled pattern, inner cell elongate, gradually narrowed posteriorly, outer cell triangular. **LEGS.** Coloration variable, uniformly pale, pale with dark spots, or uniformly red to dark brown; femora slightly flattened, narrowly rectangular, broadest on basal third, tapered slightly toward ends, with short reclining simple setae and several stout bristlelike setae dorsodistally; tibiae cylindrical, with short reclining simple setae, meso- and metatibiae with several rows of tiny dark spinulae distally, tibial spines pale or dark; tarsi cylindrical, segment I approximately half as long as segments II and III, claws moderately curved, pulvilli small, covering one-fourth or less of inner surface of claw, parempodia lamellate, converging apically (fig. 2). **GENITALIA.** *Genital capsule:* large, subtriangular in ventral view, moderately produced posteriorly beyond paramere sockets, apex angulate to nearly truncate; posterodorsal margin beyond paramere sockets variously notched, region between right socket and apex heavily sclerotized, with from one to three spinelike or flattened and apically truncate processes; lateral margins bordering aperture with many long bristlelike setae; aperture relatively large, subovate to nearly quadrate, lateral margin above base of left paramere sometimes with strong upright spine or pointed tubercle, right margin with similar but smaller process above base of paramere. *Left paramere:* L-shaped in dorsal view; sensory lobe weakly to moderately produced, with long bristlelike setae; shaft narrow, shorter than arm, sometimes slightly ex-

panded distally, or with small ridgelike flange ventrolaterally; apex pointed, narrowly rounded, or rarely truncate, sometimes excavated ventrally. *Right paramere:* shape variable, short and spatulate, or elongate with well-developed narrow shaft; dorsal surface of arm with one to several strong serrations or spines, dorsal and outer surfaces with long bristlelike setae, inner surface usually with spines or broad serrations; elongate shaft when present also with dorsal, internal, and/or apical serrations; apex pointed, angulate, or broadly rounded. *Phallosome:* slightly compressed laterally; broadly opened dorsally for nearly entire length, narrowly closed and ringlike basally; dorsal margins usually highly convoluted and/or notched. *Vesica:* ductus seminis simple, cylindrical, flexible with ribs; secondary gonopore horseshoe-shaped, weakly sclerotized; two vesical spiculae projecting posteriorly from middle of ductus, bases of spiculae situated dorsal (dorsal spicula, DS) and left-lateral (lateral spicula, LS) to midline of ductus; spiculae recurved, each with 2–6 variously shaped, weakly to strongly flattened branches that are usually serrate marginally and/or apically, rarely with surface serrations distally; lateral spicula longer and usually less highly branched than dorsal spicula.

**FEMALE.** Length (tip of tylus to apices of hemelytra) 2.96–4.52; strongly brachypterous, membrane of forewing reduced to narrow flap. Similar to male in color, vestiture, and structure, except usually slightly smaller with more ovoid body form; head slightly larger; tylus more strongly produced basally; pronotum smaller with more prominent calli, posterior margin strongly concave; scutellum swollen distally, weakly produced basally; hemelytra weakly to strongly rounded laterally, sometimes slightly convex dorsodistally; cuneus short, incisure and fracture obsolete to moderately developed, apex subangulate to broadly rounded. **GENITALIA.** Following terminology of Slater, 1950. *Sclerotized rings:* Large, heavily sclerotized, widely separated, with well-developed ribbonlike posterior process curving downward and attaching to ramus-body wall connector; lateral margin of ring strongly folded dorsomesad, sometimes extending across ring to mesal margin; F structure sometimes weakly sclerotized and

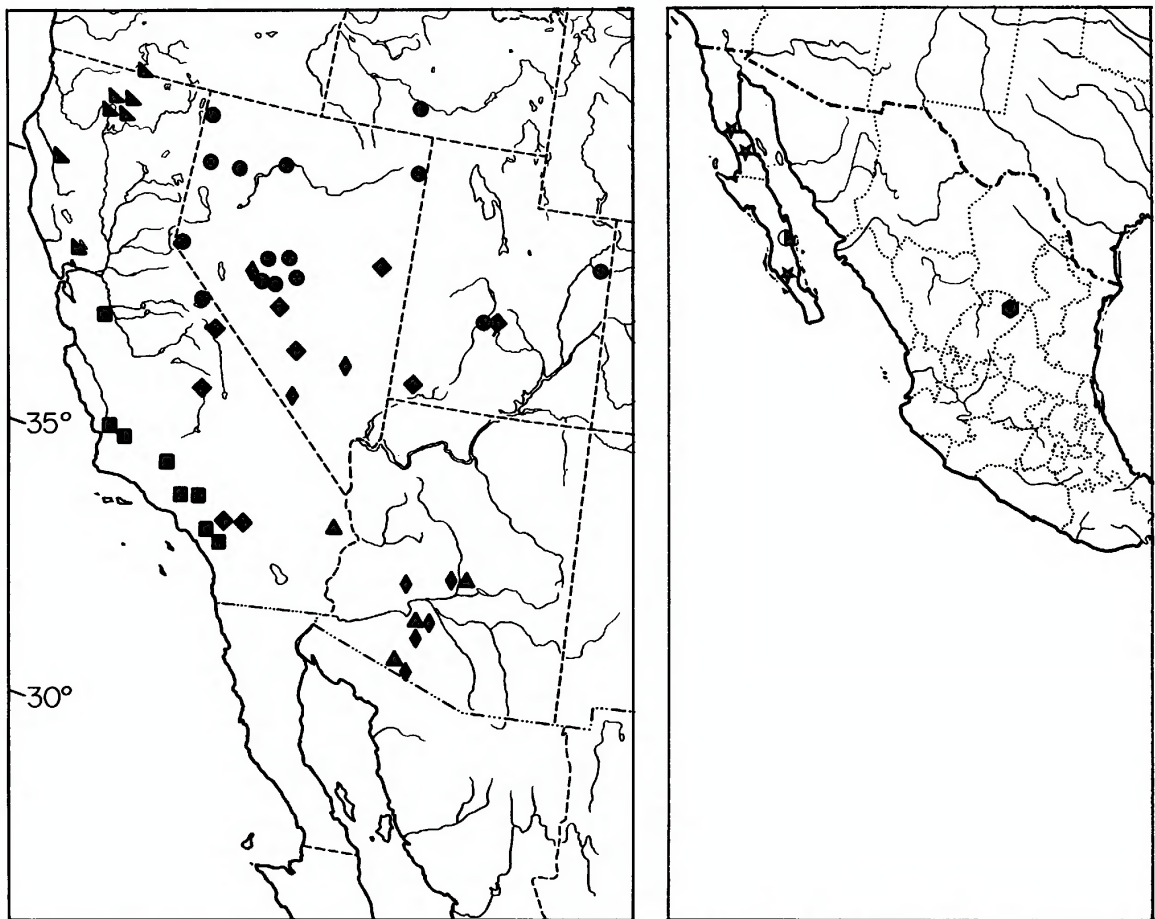


Fig. 7. Distribution of *Squamocoris* and *Ramentomiris* species: ▲, *S. arizonae*; ■, *S. fumosus*; ◆, *S. latisquamus*; ◈, *S. pallidinervus*; ▴, *S. purshiae*; ●, *S. schaffneri*; ●, *S. utahensis*; ★, *R. baja*; ⊙, *R. loreto*.

differentiated from surrounding membrane. *Posterior wall*: K structures large, deeply bifid, arising from posterior margin of J structure, usually well-separated medially; L structure sometimes developed dorsally to level of K structures.

**TYPE SPECIES:** *Squamocoris utahensis* Knight.

**DISTRIBUTION:** Figure 7. Known from western North America, ranging from southern Oregon and Idaho, east to the Colorado-Utah border, and south to the state of Zacatecas in Mexico. Three female specimens of a yet undescribed species also were examined from El Crucero, Baja California Norte, Mexico.

**DISCUSSION:** Because of the rarity of specimens in collections and the lack of adequate

defining characters in the original generic description, *Squamocoris* has remained an obscure genus since its conception. The diagnostic features provided by Knight (e.g., prominent tylus with angulate basal half, body with flattened scalelike setae, pronotal disk with carinate anterior angles) are not unique to *Squamocoris*, but rather partially define a group of related genera. In this paper, we identify several morphological features unique to *Squamocoris*, as well as characters that we believe define the relationship of this genus to other Orthotylini (see Cladistic Analysis section).

The host plant associations of *Squamocoris* species are diverse and do not support or detract from the species relationships proposed in our cladistic hypothesis. Members



of this genus have been collected on plants belonging to six different families as follows: Asteraceae (\**Artemisia*, *Hymenoclea*), Chenopodiaceae (*Grayia*, \**Sarcobatus*), Lamiaceae (*Salazaria*), Rhamnaceae (*Ceanothus*, *Condalia*), Rosaceae (\**Purshia*), and Solanaceae (\**Lycium*) (\* indicates well-established host plant association).

### KEY TO ADULT *SQUAMOCORIS* SPECIES

1. Vestiture of dorsum with silvery white and dark brown or black scalelike setae, the latter sometimes restricted to postero-lateral portion of corium; femora uniformly pale yellow, or pale with dark spots; males: length 4.91–7.09, areolar veins pale ..... 2
- Vestiture of dorsum with silvery white scalelike setae only; femora bright red, reddish brown, or fuscous; males: length 6.77–8.03, areolar veins dark ..... 5
- 2(1). Lateral margins of pronotal disk weakly to moderately carinate, more strongly so on anterior fourth to one-third; hemelytra grayish white or pale brownish yellow, sometimes lightly tinged with brown; genital capsule of male with tubercle above base of left paramere (figs. 17F–G, 20F–G) ..... 3
- Lateral margins of pronotal disk rounded, with no strong ridge anteriorly; hemelytra grayish white, moderately to extensively darkened with brown or fuscous, genital capsule of male without tubercle above base of left paramere (figs. 17M, 18N) ..... 4
- 3(2). Femora pale with fuscous spots; head, pronotum, and scutellum of male mostly dark brown or black (fig. 16); female hemelytra rounded or broadly angulate apically; male genitalia as in figure 20A–G; east-central California, Idaho, Nevada, Utah ..... *utahensis* Knight
- Femora uniformly pale; head, pronotum, and scutellum pale brownish yellow, with no dark markings (fig. 8); female hemelytra broadly notched apically (fig. 9); male genitalia as in figure 17A–G; Arizona and southeastern California ..... *arizonae* Knight
- 4(2). Hemelytra, including membrane, mottled with dark brown or fuscous (fig. 13); pronotum with pale longitudinal line medially, sometimes obscured in female; males, length 5.63–6.03, genitalia as in figure

- 18I–N; females, length 3.73–3.89; Arizona and Nevada ... *latisquamus* n. sp.
- Hemelytra lightly to moderately suffused with fuscous, without mottled pattern, membrane with large fuscous spot bordering inner apical angle of large areole (fig. 10); pronotum without pale median line, or females sometimes with faint line; males, length 4.91–5.11, genitalia as in figure 17H–M; female, length 3.01–3.33; Zacatecas, Mexico ..... *schaffneri* n. sp.
- 5(1). Embolar margin, and usually claval and radial veins, pale; tubercle above base of left paramere broad basally, abruptly narrowed distally (fig. 19G–H); right paramere broadly rounded apically (fig. 19E); southeastern California, southern Nevada and Utah ..... *pallidinervus* n. sp.
- Embolar margin, and claval and radial veins dark; tubercle above base of left paramere elongate, evenly tapered (figs. 18G, 19O); right paramere acute apically (figs. 18E–F, 19M–N); western Oregon and California ..... 6
- 6(5). Hind femora bright red, sometimes darker reddish brown or fuscous apically; shaft of left paramere narrow, with no ventrolateral flange (fig. 19K), arm of right paramere with single broad spine dorsally (fig. 19M–N); spiculae of vesica as in figures 19I–J; southwestern Oregon and northwestern California ..... *purshiae* n. sp.
- Hind femora dark yellowish brown to fuscous, sometimes lightly tinged with red; shaft of left paramere broader, with small ventrolateral flange (fig. 18C); arm of right paramere with one or two narrow spines dorsally (fig. 18E–F); spiculae of vesica as in figure 18A–B; southwestern California ..... *fumosus* n. sp.

### *Squamocoris arizonae* Knight

Figures 3, 7, 8, 9, 17A–G

*Squamocoris arizonae* Knight, 1968, p. 109.

**DIAGNOSIS:** Recognized by pale brownish yellow general coloration without dark markings (figs. 8–9), lateral margins of pronotal disk carinate, vestiture of dorsum with dark brown and silvery white scalelike setae, and structure of the male genitalia (fig. 17A–G). Hemelytra of female deeply notched apically; male with pale areolar veins.

**REDESCRIPTION: MALE.** Figure 8. Length 5.42–5.63; pale brownish yellow general coloration; dorsal vestiture a mixture of golden

simple setae and brown and silvery white scalelike setae; pronotum with longitudinal medial line of silvery white scalelike setae, continuing onto vertex and base of scutellum. HEAD. Width across eyes 0.81–0.83, width of vertex 0.40–0.42; frons flat, with several red or reddish brown transverse striae; eyes large, occupying nearly two-thirds of head height in lateral view; antennae yellowish brown, length of segment I 0.76–0.86, distinctly broadened medially, segment II 1.69–1.76, labium reaching between mesocoxae or slightly beyond. PRONOTUM. Posterior width 1.30–1.36; lateral margins moderately carinate, anterolateral angle strongly ridge-like; disk usually with scattered reddish spots; calli weakly convex, margins slightly depressed; mesosternum fuscous. HEMELYTRA. Pale brownish yellow; membrane lightly suffused with fuscous, veins pale. LEGS. Femora and tibiae pale yellow, without dark spots, femora sometimes darker yellowish brown distally; tarsi and apices of tibiae brown or yellowish brown; tibial spines pale. GENITALIA. *Genital capsule*: apex truncate, posterodorsal margin with three small processes, one near socket of right paramere and one each side of midline at apex; margin of capsule with large, broad, apically pointed tubercle above base of left paramere, right margin without tubercle above paramere base. *Left paramere*: shaft very narrow; apex flattened, truncate, slightly excavated ventrally, *Right paramere*: arm with strong spinelike process dorsally; shaft broad, inner surface with one strong spine dorsally and several smaller spines ventrally; apex pointed. *Vesica*: DS with four primary branches, basalmost branch with small accessory process medially; LS with two primary branches, each of these deeply bifurcate, left branch (one with sinistral origin in lateral view) with small spinelike process just proximal to furcation.

FEMALE. Figure 9. Ovoid, hemelytra strongly rounded laterally, slightly arched dorsally, apex deeply notched, cuneal fracture and incisure moderately developed. Coloration and vestiture as in male except hemelytra often slightly darker. Length 2.96–3.05; width of pronotum 0.87–0.98; width of head across eyes 0.83–0.85; width of vertex 0.46–0.48; length of antennal segment I 0.86–0.89, segment II 1.91–2.03.

DISTRIBUTION: Figure 7. San Bernardino Co., California, and Maricopa and Pima counties, Arizona.

DISCUSSION: Adults have been collected on *Lycium* sp. (Solanaceae) in California. Several males have been taken at light.

SPECIMENS EXAMINED: USA. **Arizona.** *Maricopa Co.*: 2♂, Salt River Mountains, 1300 ft (396 m), 9 May 1926, A. A. Nichol (holotype and paratype, USNM); 1♂, Sierra Estrella, 24 April 1983, J. T. and D. A. Polhemus, at UV light (JTP). *Pima Co.*: 1♂, Ajo Valley, Organ Pipe Cactus Nat. Mon., 10 April 1981, D. A. Polhemus (JTP). **California.** *San Bernardino Co.*: 9♂, 8♀, 1.3 mi S of Goffs, 845 m, 16 May 1978, ex. *Lycium* sp. (Solanaceae) R. T. Schuh (AMNH, UCR).

### *Squamocoris fumosus*, new species

Figures 7, 12, 18A–H

DIAGNOSIS: Recognized by its large size, uniformly dark brown (smoky) coloration, vestiture of dorsum with all scalelike setae silvery white, and by structure of the male genitalia (fig. 18A–H), especially the long narrow tubercle above base of left paramere (fig. 18G). Differs from the closely related *purshiae* by the darker hind femora; broader shaft of left paramere, with small ventrolateral flange; arm of right paramere with one or two narrow spine(s) dorsally; dorsal spicula of vesica with narrow, undivided, strongly recurved distal branch (branch with distalmost origin), with 2–3 strong serrations distally; and medial branch of dorsal spicula without marginal serrations (fig. 18B).

DESCRIPTION: MALE. Figure 12. Length 7.25–7.53; dark brown general coloration; dorsal vestiture with dark, simple setae and silvery white scalelike setae, also with long, black bristlelike setae mostly on pronotum, scutellum, and along veins of clavus and corium; pronotum and scutellum with longitudinal median line of silvery white scalelike setae, continuing onto vertex and frons; pronotum between middle and lateral margin with less distinct line of white scalelike setae, continuing along inner margin of eye to antennal fossa. HEAD. Width across eyes 1.06–1.08, width of vertex 0.53–0.54; dark brown, underparts yellowish brown or reddish brown,

vertex sometimes with pale median mark; frons slightly convex, weakly sloping; eyes occupying slightly more than half of head height in lateral view; lower margin of antennal fossa even with ventral margin of eye; antennae dark brown, length of segment I 1.11–1.16, slightly broader medially, segment II 2.47–2.50; labium reaching between metacoxae. PRONOTUM. Posterior width 1.46–1.48; uniformly dark brown, posterior lobe sometimes lighter brown; lateral and posterior margins arcuate; anterolateral angle strongly ridgelike; calli weakly elevated, margins slightly depressed; scutellum moderately arched, dark brown, apex sometimes narrowly pale. HEMELYTRA. Uniformly dark brown, cuneus sometimes reddish brown; posterolateral angle of corium narrowly pale; membrane smoky, veins dark. LEGS. Femora brown or dark brown, sometimes tinged with red, front and middle pairs sometimes lighter yellowish brown; tibiae brown or dark brown, tibial spines dark; tarsi dark brown. GENITALIA. *Genital capsule*: apex angulate, deeply notched on left side, right posterodorsal margin with flattened apically truncate process; margin of capsule with elongate tubercle above base of each paramere. *Left paramere*: arm elongate, sensory lobe weakly produced; shaft broad, tapering distally, with small ridgelike flange ventrolaterally; apex pointed. *Right paramere*: short, spatulate with one or two narrow spine(s) dorsally and another more inwardly directed spine preapically; inner surface of arm with broad medial spine. *Vesica*: DS with three primary branches, distal branch (one with distalmost origin in lateral view) strongly recurved, with limited marginal serrations; medial branch directed distally, narrowly blade-like, margins entire; basal branch bifurcate, furcations nearly linear, left furcation longer, laterally directed, with serrate upper margin. LS with two primary branches, each with serrate margins, left branch with small basally directed palmate process near origin.

FEMALE: Unknown.

ETYMOLOGY: From the Latin, *fumosus* (smoky), referring to the general coloration of the species.

DISTRIBUTION: Figure 7. Known from Kern, Los Angeles, Riverside, and San Luis Obispo counties, California.

DISCUSSION: The host plant association is not known. Males are attracted to light.

HOLOTYPE ♂: USA. **California**: *Riverside Co.*, Menifee Valley, 16 June 1975, J. D. Pinto; deposited in the American Museum of Natural History, New York.

PARATYPES: USA. **California**. *Kern Co.*: 1♂, Lebec, 1220 m, 15 May 1928, J. O. Martin (CAS). *Los Angeles Co.*: 2♂, Mint Canyon, 16 and 21 May 1937, E. P. Van Duzee (CAS); 1♂, 22 mi S of Palmdale, CL1625, 914 m, 30 May 1981, at UV light trap, J. T. Polhemus (JTP). *Riverside Co.*: 1♂, Menifee Valley (hills on west end), 33°39'N 117°13'W, 550 m, 21 May 1982, at light, J. D. Pinto (UCR); 1♂, Quail Valley, Coastal Sage Scrub Comm., June 1975, at black light, J. D. Pinto (UCR). *San Luis Obispo Co.*: 1♂, Tassajara Creek, 7 mi N of San Luis Obispo, 4–5 June 1971, at light, J. D. Pinto (UCR); 1♂, Temblor Range, 12 mi E of Simmler, 975 m, 25 April 1964, W. Turner (UCB). *Stanislaus Co.*: 1♂, Del Puerto Cyn., 21 June 1975, J. B. Johnson (Mich. St. Univ.).

*Squamocoris latisquamus*, new species

Figures 2, 4, 7, 13, 18I–N

DIAGNOSIS: Similar to *schaffneri* in general appearance but distinguished by the larger size, dark mottled pattern on the hemelytra, pronotal disk usually with pale longitudinal line medially, and by the structure of the male genitalia, especially the highly branched dorsal spicula of the vesica (fig. 18J) and the less branched lateral spicula (fig. 18I).

DESCRIPTION: MALE. Length 5.63–6.03; dark grayish brown general coloration; dorsal vestiture as in generic description including broad, black, scalelike setae; silvery white scalelike setae on pronotum usually more heavily concentrated near midline. HEAD. Width across eyes 1.03–1.17, width of vertex 0.51–0.60; creamy white; vertex, base of tylus, margins of antennal fossae, and apex of jugum marked with reddish brown or fuscous; frons slightly convex, weakly sloping, pale medially, broadly darkened laterally; eyes prominent, projecting well beyond anterolateral angles of pronotum in dorsal view, occupying slightly more than half of head height in lateral view; antennal fossa situated



at or slightly below ventral margin of eye; antennae brown or dark yellowish brown, segment I usually lighter dorsally with dark spots at bases of bristlelike setae, only slightly broader medially; length of segment I 0.83–0.91, segment II 1.84–2.10; labium reaching apex of mesosternum or between mesocoxae. PRONOTUM. Posterior width 1.28–1.46; grayish white ground color, moderately to extensively darkened with brown or fuscous, usually with darker spots at bases of simple setae, middle of disk usually with longitudinal pale line; lateral and posterior margins slightly arcuate; anterolateral angle broadly rounded, not ridgelike; calli moderately convex, margins slightly depressed and sometimes tinged with red; scutellum mostly fuscous, apex and sometimes narrow median line pale; mesosternum fuscous. HEMELYTRA. Grayish white, moderately to extensively mottled with brown or fuscous; claval and radial veins slightly elevated; membrane marbled with fuscous, veins pale. LEGS. Femora creamy white or pale yellow with large reddish brown or fuscous spots, more so dorsodistally; tibiae pale with dark spots at spine bases; tibial spines black; tarsi and apices of tibiae fuscous. GENITALIA. *Genital capsule*: apex truncate, broadly notched, right posterodorsal margin with broad weakly flattened tubercle; margin of capsule without tubercles above paramere base. *Left paramere*: sensory lobe moderately produced; shaft short, excavated ventrodistally; apex rounded. *Right paramere*: elongate with well-developed shaft; inner dorsal surface of arm with strong spinelike process and several smaller serrations; dorsal surface of shaft also with small serrations; apex serrotruncate. *Vesica*: DS short, with three primary branches, each bifurcate, basalmost branch in lateral view strongly curved, with marginal and surface serrations on longer laterally directed furcation. LS long, simple, strongly recurved distally with single slender spine originating below curvature; shallowly bifurcate near apex, lateral margins of furcations serrate.

FEMALE. Similar to male in color, vestiture, and structure except for characters given in generic description. Scutellum more strongly convex distally; hemelytra slightly rounded laterally, flat dorsally; cuneus short, mostly fuscous, apex narrowly rounded; cuneal frac-

ture and incisure weakly developed. Length 3.73–3.89, width of pronotum 1.08–1.12; width of head across eyes 1.15–1.16, width of vertex 0.60–0.62; length of antennal segment I 1.10–1.18, segment II 2.34–2.49.

ETYMOLOGY: From the Latin, *latus* (broad) and *squama* (scale), to describe the broad, scalelike setae on the dorsum.

DISTRIBUTION: Figure 7. Known from Lincoln and Nye counties, Nevada, and Maricopa and Pima counties, Arizona.

DISCUSSION: Adults have been collected on *Condalia spathulata* Gray (Rhamnaceae), *Grayia spinosa* (Hook.) Moq. (Chenopodiaceae), *Lycium andersonii* Gray, *L. berlandieri* Dunal. var. *parviflorum* (Gray.) Terac., and *Lycium* sp. nr. *parishii* Gray (Solana-ceae). Nymphs have been taken on several species of *Lycium*.

HOLOTYPE ♂: USA. Arizona: Pima Co., Organ Pipe Cactus Nat. Mon., Alamo Wash, 700–800 m, 26–27 March 1981, ex. *Lycium berlandieri* var. *parviflorum*, R. T. Schuh and M. D. Schwartz; deposited in the American Museum of Natural History, New York.

PARATYPES: USA. Arizona. Maricopa Co.: 1♀, Sand Tank Mts., SE of Gila Bend, 935 m, 8 May 1978, R. T. Schuh and A. F. Guenther (AMNH); 11♂, 6♀, Sierra Estrella, 24 April 1983, ex. *Condalia spathulata*, J. T. and D. A. Polhemus (JTP); 5♂, 1♀, 10 mi S of Sunflower, 18 April 1982, D. A. and J. T. Polhemus (JTP); 2♀, 14 mi SW of Wickenburg on Vulture Mine Rd., 600–700 m, 1 April 1981, ex. *Lycium andersonii* or *L. berlandieri*, R. T. Schuh and M. D. Schwartz (AMNH). Pima Co.: 10♂, 10♀, same data as holotype except all but one male reported from *Lycium* sp.; 1♂, Ajo Mts., 21 April 1935, E. Ball (USNM). Nevada: Lincoln Co.: 3♀, 5 mi NE of jct. Rts. 38 and 93, 762 m, 19 May 1982, ex. *Grayia spinosa*, M. D. Schwartz (AMNH). Nye Co.: 1♂, 4♀, Nevada Atomic Test Site, S of Guard Station 500 on Jackass Flats Rd. (A25), 1006 m, 6 June 1983, ex. *Lycium andersoni*, R. T. Schuh, M. D. Schwartz, and G. M. Stonedahl (AMNH); 1♀, 2.5 mi E of Gabbs on Rt. 844, 1615 m, 1 July 1983, ex. *Lycium andersonii*, R. T. Schuh and M. D. Schwartz (AMNH).

ADDITIONAL SPECIMENS: 29 nymphs were examined from near Wickenburg, Maricopa Co. and Organ Pipe Cactus Nat. Mon., Pima

Co., Arizona. All specimens were collected between 26 March and 1 April on *Lycium*.

***Squamocoris pallidinervus*, new species**

Figures 7, 14, 19A–H

**DIAGNOSIS:** Similar to *fumosus* but distinguished by the pale embolar margin and veins of the clavus and corium, and by the structure of the male genitalia, especially the short broadly rounded right paramere with weak serrations dorsally (fig. 19E–F), the broad left genital tubercle with distal region abruptly narrowed (fig. 19G–H), and dorsal spicula of vesica with distally broadened, strongly serrate distal branch and expanded, distally serrate medial branch (fig. 19B).

**DESCRIPTION: MALE.** Figure 14. Length 7.47–8.03; brown or dark brown general coloration; dorsal vestiture as in generic description including long, dark bristlelike setae, but without dark scalelike setae; pronotum with five longitudinal lines of silvery white scalelike setae, median line continuing anteriorly to base of tylus and posteriorly to apex of scutellum; midlateral pair continuing anteriorly along eyes to antennal fossae and posteriorly onto anterolateral angles of scutellum; lateral pair confined to margins of disk. **HEAD.** Width across eyes 1.07–1.12, width of vertex 0.50–0.56; dark brown to nearly black, underparts lighter reddish brown, base of frons sometimes with pale median mark; frons slightly convex, weakly sloping; eyes occupying approximately three-fifths of head height in lateral view; lower margin of antennal fossa at level of ventral margin of eye; antennae dark brown to nearly black; length of segment I 0.98–1.02, slightly broader medially, segment II 2.31–2.49; labium reaching between mesocoxae or slightly beyond. **PRONOTUM.** Posterior width 1.57–1.58; uniformly brown or dark brown; lateral margins arcuate, posterior margin weakly arcuate to nearly straight; anterolateral angle strongly ridgelike; calli weakly elevated, margins slightly depressed, more strongly so posteriorly; scutellum moderately arched, dark brown, apex pale. **HEMELYTRA.** Brown or dark brown, cuneus sometimes more reddish brown; embolar margin, posterolateral angle of corium, and usually claval and radial veins pale; membrane smoky, veins dark. **LEGS.**

Femora brown or dark brown, front and middle pairs sometimes yellowish brown at least dorsally; tibiae and tarsi brown or dark brown; tibial spines dark. **GENITALIA.** *Genital capsule:* apex angulate, deeply notched on left side, right posterodorsal margin with flattened apically truncate process; margin of capsule with broad distally tapered tubercle above base of left paramere and smaller more evenly tapered tubercle above base of right paramere. *Left paramere:* sensory lobe weakly produced, nearly flat dorsally; shaft broad basally, tapering distally; apex pointed. *Right paramere:* short, broadly rounded apically; dorsal surface of arm with series of weak serrations, or rarely with one or two small spines; inner surface of paramere with two broad flattened serrations medially, one near base of arm and one near apex. *Vesica:* DS with three primary branches; distal branch strongly recurved, abruptly broadened distally, with strongly serrate margins; medial branch directed distally, gradually expanded beyond middle, with serrate distal margins; basal branch bifurcate, furcations narrow, left furcation longer, laterally directed, with serrate margins. LS with two primary branches, each with serrate margins, left branch with small basally directed palmate process near origin.

**FEMALE.** Similar to male in color, vestiture, and structure except for characters given in generic description. Scutellum not or only slightly more convex distally; hemelytra moderately rounded laterally, claval and radial veins usually more broadly pale than in males; cuneus very short, mostly fuscous, apex broadly rounded; cuneal fracture and incisure obsolete. Length 4.20–4.52, width of pronotum 1.07–1.20; width of head across eyes 1.19–1.22, width of vertex 0.60–0.64; length of antennal segment I 1.16–1.20, segment II 2.75–2.84.

**ETYMOLOGY:** From the Latin, *pallidus* (pale) and *nervus* (nerve), to describe the pale claval and radial veins of the hemelytra.

**DISTRIBUTION:** Figure 7. Known from southeastern California, southern Nevada, and southern Utah.

**DISCUSSION:** Adults have been taken on *Artemisia*, *Hymenoclea* (Asteraceae), and *Salazaria* (Lamiaceae).

**HOLOTYPE** ♂: USA. **California:** San Bernardino Co., 1.5 mi N of Yucca Valley, 1155



m, 13 May 1978, ex. *Salazaria mexicana* Torr., R. T. Schuh and J. D. Pinto; deposited in the American Museum of Natural History, New York.

PARATYPES: USA. **California.** *Mono Co.*: 1♂, Cottonwood Creek, 2835 m, 10 July 1961, W. A. Foster (UCB). *San Bernardino Co.*: 1♂, Morongo, 19 April 1939, T. D. A. Cockerell (USNM); 1♂, Morongo, 6 May 1948, ex. *Hymenoclea salsola* Torr. and Gray., Timberlake (UCR). *Tulare Co.*: 1♀, 21 mi W of Rt. 395 toward Kennedy Meadows, 1875 m, 1 July 1980, ex. *Artemisia tridentata* Nutt., R. T. Schuh (AMNH). **Nevada.** *Nye Co.*: 1♀, 1 mi NE of Belmont on St. Hwy. 82, 2225 m, 13 July 1980, ex. *Artemisia* sp., G. M. Stonedahl (AMNH); 1♀, Nevada Atomic Test Site, 1.5 mi W of Area 12 Camp on Stockade Wash Rd., 7 June 1983, ex. *Artemisia tridentata*, R. T. Schuh, M. D. Schwartz, and G. M. Stonedahl (AMNH). *White Pine Co.*: 1♀, 2.3 mi N of U.S. Hwy. 50 on Steptoe Crk. Rd., 2075 m, 19 July 1980, ex. *Artemisia* sp., G. M. Stonedahl (AMNH). **Utah.** *Sevier Co.*: 1♀, 2.4 mi S of Rt. 4 on Kanosh Rd., 2181 m, 16 July 1980, ex. *Artemisia tridentata*, R. T. Schuh and G. M. Stonedahl (AMNH). *Washington Co.*: 1♂, Pine Valley, 16 June 1961, D. Davis (USU).

*Squamocoris purshiae*, new species

Figures 7, 15, 19I-P

DIAGNOSIS: Similar to *fumosus* and *pallidinervus* but distinguished by the nearly black general coloration with strongly contrasting bright red femora, and by the structure of the male genitalia: shaft of left paramere narrow, without ventrolateral flange (fig. 19K); right paramere acute apically, inner surface with three strong serrations, dorsal surface with single broad spine (fig. 19M-N); dorsal spicula of vesica with bifurcate distal branch, medial branch with serrate outer basal margin (fig. 19J). Further distinguished from *pallidinervus* by the dark claval and radial veins and by the elongate, evenly tapered left genital tubercle of the male (fig. 19O-P).

DESCRIPTION: MALE. Figure 15. Length 6.77-6.93; piceous to black general coloration; dorsal vestiture with short, black simple setae and silvery white scalelike setae; pronotum usually with heavier concentration

of scalelike setae near midline; vertex with longitudinal row of setae medially and bordering each eye, extending to near anterior margin of eye. HEAD. Width across eyes 1.03, width of vertex 0.51-0.52; piceous or black underparts usually more reddish, vertex sometimes with pale median mark; frons nearly flat, weakly sloping; eyes occupying slightly more than half of head height in lateral view; lower margin of antennal fossa at level of ventral margin of eye; antennae fuscous to black, length of segment I 1.05-1.10, slightly broader medially, segment II 2.41-2.44; labium reaching between mesocoxae. PRONOTUM. Posterior width 1.44-1.51; uniformly piceous to black; lateral and posterior margins arcuate; anterolateral angle strongly ridgelike; calli weakly elevated, margins slightly depressed, more so posteriorly; scutellum moderately and evenly arched, uniformly darkened. HEMELYTRA. Uniformly piceous to black; membrane smoky, veins dark. LEGS. Femora bright red, sometimes grading to piceous distally; tibiae and tarsi piceous to nearly black; tibial spines dark. GENITALIA. *Genital capsule*: apex angulate, left margin deeply notched, right posterodorsal margin with flattened apically truncate process; left margin of capsule above base of paramere with elongate evenly tapered tubercle, right margin with much smaller knoblike tubercle above base of paramere. *Left paramere*: sensory lobe weakly produced, nearly flat dorsally; shaft narrow, without ventrolateral flange; apex acute. *Right paramere*: short, spatulate with single strong spine dorsally; inner margin with three prominent serrations along medial longitudinal line; ventral surface slightly excavated. *Vesica*: DS with three primary branches, distal branch strongly recurved, bifurcate, without serrations; medial branch long, directed distally, nearly linear, basolateral margin serrate; basal branch bifurcate, larger left furcation directed laterally, with serrate upper and distal margins. LS with two primary branches, each with serrate margins; left branch bifurcate, right (lower) furcation much larger than in *fumosus* and *pallidinervus*, gradually broadening to serrotruncate apex.

FEMALE. Similar to male in color, vestiture, and structure except for characters given in generic description. Scutellum not or only

slightly more convex distally than at base; hemelytra short, flat, moderately rounded laterally; cuneus very short, apex broadly rounded; cuneal fracture and incisure obsolete. Length 3.63–3.84, width of pronotum 1.15–1.18; width of head across eyes 1.07–1.15, width of vertex 0.58–0.62; length of antennal segment I 1.18–1.31, segment II 2.63–2.77.

**ETYMOLOGY:** Named for the genus of its host plant *Purshia tridentata* (Pursh.) DC. (Rosaceae).

**DISTRIBUTION:** Figure 7. Known from southern Oregon and northern California.

**DISCUSSION:** The majority of 14 known specimens were taken on *Purshia tridentata*, which appears to be the host plant of the species.

**HOLOTYPE** ♂: USA. **California:** *Siskiyou Co.*, 10 mi NE of Weed, Jct. Rts. 97 and 12, 3800 ft (1158 m), 21 June 1981, ex. *Purshia tridentata*, J. D. Lattin; deposited in the American Museum of Natural History, New York.

**PARATYPES:** USA. **California:** *Napa Co.*: 1♀, Mt. St. Helena, 9 June 1918, E. P. Van Duzee (CAS). *Siskiyou Co.*: 1♂, Medicine Lk. Rd., 1463 m, 26 June 1979, ex. *Purshia tridentata*, G. M. Stonedahl (AMNH); 7♀, 12.3 mi N of St. Hwy. 89 on Powder Hill Rd., 19 July 1985, ex. *Purshia tridentata*, G. M. Stonedahl and J. D. McIver (AMNH); 2♀, 15 mi SE of Mount Shasta, 1067 m, 10 July 1972, C. Musgrave (OSU). *Trinity Co.*: 1♂, 18 mi S of Zenia, 23 June 1969, ex. *Ceanothus cuneatus* (Hook.) Nutt., W. F. Barr (UID). **Oregon.** *Klamath Co.*: 1♂, between Worden and Keno, 1280 m, 27 June 1979, ex. *Purshia tridentata*, R. T. and J. Schuh (AMNH).

***Squamocoris schaffneri*, new species**

Figures 1, 5, 7, 10, 11, 17H–M

**DIAGNOSIS:** Recognized by small size; grayish white general coloration with light to moderate fuscous suffusion; large dark spot bordering inner apical angle of large areole; rounded lateral margins of the pronotum, without strong ridge anteriorly; and by the structure of the male genitalia, especially the long apical process of the right paramere (fig. 17K–L), and genital capsule without tubercles above paramere bases. Distinguished

from *fumosus*, *pallidinervus*, and *purshiae* by the pale femora with dark spots, pale areolar veins, and vestiture of dorsum with dark scalelike setae; distinguished from *latisquamus* by its smaller size, pronotum without pale line medially, hemelytra more or less uniformly suffused with fuscous, not mottled, membrane of forewing with large fuscous spot bordering inner apical angle of large areole, and the structure of the male genitalia.

**DESCRIPTION: MALE.** Figure 10. Length 4.91–5.11; brownish general coloration; dorsal vestiture with black simple setae, dark brown or black scalelike setae, and silvery white scalelike setae; pronotum with silvery scalelike setae arranged in five broad longitudinal lines, more randomly scattered on calli; vertex and frons with transverse rows of silvery scales. **HEAD.** Width across eyes 0.96–1.03, width of vertex 0.48–0.51; creamy white with brownish tinge on vertex and frons; vertex, tylus, and antennal fossae with red or reddish brown markings; frons slightly convex, moderately sloping, with 6–8 reddish striae either side of pale median line; eyes prominent, projecting well beyond anterolateral angles of pronotum in dorsal view, occupying slightly more than half of head height in lateral view; lower margin of antennal fossa situated slightly below ventral margin of eye; antennae brown or yellowish brown, segment I usually somewhat lighter with dark spots at bases of bristlelike setae, only slightly broader medially; length of segment I 0.65–0.74, segment II 1.61–1.74; labium reaching between mesocoxae or slightly beyond. **PRONOTUM.** Posterior width 1.09–1.21; lateral margins rounded, without strong ridge anteriorly; posterior margin nearly straight; disk grayish white, lightly to moderately suffused with fuscous, usually slightly darker laterally; calli moderately convex, bordered by shallow depression posteriorly and medially, mottled with reddish brown or fuscous; scutellum dark brown, apex and narrow median line pale. **HEMELYTRA.** Grayish white, lightly to moderately suffused with fuscous, posterolateral angle of corium and base of cuneus remaining pale in darker specimens; claval and radial veins elevated; membrane lightly suffused with fuscous, more so distally, with large fuscous spot bordering inner posterior angle of large areole, some-



times with additional dark spots inside or bordering areoles, veins pale. LEGS. Femora creamy white or pale yellow, with several rows of reddish brown or fuscous spots, usually tinged with fuscous dorsodistally; tibiae pale with dark spots at spine bases, tibial spines dark brown; apices of tibiae and tarsi brown or yellowish brown. GENITALIA. *Genital capsule*: apex angulate, posterodorsal margin with single spine on right side near apex; without tubercles above paramere bases. *Left paramere*: sensory lobe moderately produced, junction with shaft broadly concave in lateral view; shaft strongly upturned distally; apex truncate, weakly excavated ventrally. *Right paramere*: elongate; arm with strong broad spine dorsally and several strong serrations dorsodistally; inner apical region of arm and base of shaft also with several serrations; shaft narrow, weakly twisted, compressed laterally; slightly excavated distally with 1–2 small spines dorsally; apex narrowly spinelike. *Vesica*: DS strongly recurved, with two primary branches, each deeply bifurcate; right branch of DS (one with dextral origin in lateral view) with longer curved furcations, lower left furcation without marginal serrations; LS with two primary branches, each deeply bifurcate, basally directed furcation of right primary branch with triangulate process medially.

**FEMALE.** Figure 11. Similar to male in color, vestiture, and structure, except for characters given in generic description. Scutellum only slightly more convex distally; hemelytra flat, weakly rounded laterally; cuneus mostly fuscous, fracture and incisure weakly developed. Length 3.01–3.33, width of pronotum 0.91–0.93; width of head across eyes 1.07–1.08, width of vertex 0.55–0.58; length of antennal segment I 0.80–0.82, segment II 2.00–2.26.

**ETYMOLOGY:** Named for Joseph C. Schaffner, Professor of Entomology, Texas A&M University, College Station.

**DISTRIBUTION:** Figure 7. Known only from the type locality in Zacatecas, Mexico.

**DISCUSSION:** The host plant association is not known.

**HOLOTYPE** ♂: MEXICO. **Zacatecas**: 6 mi S of Concepcion del Oro, 9 July 1983, Kovarik, Harrison, Schaffner; deposited in the American Museum of Natural History, New York.

**PARATYPES:** 24♂, 15♀, same data as holotype (AMNH, USNM, TAM).

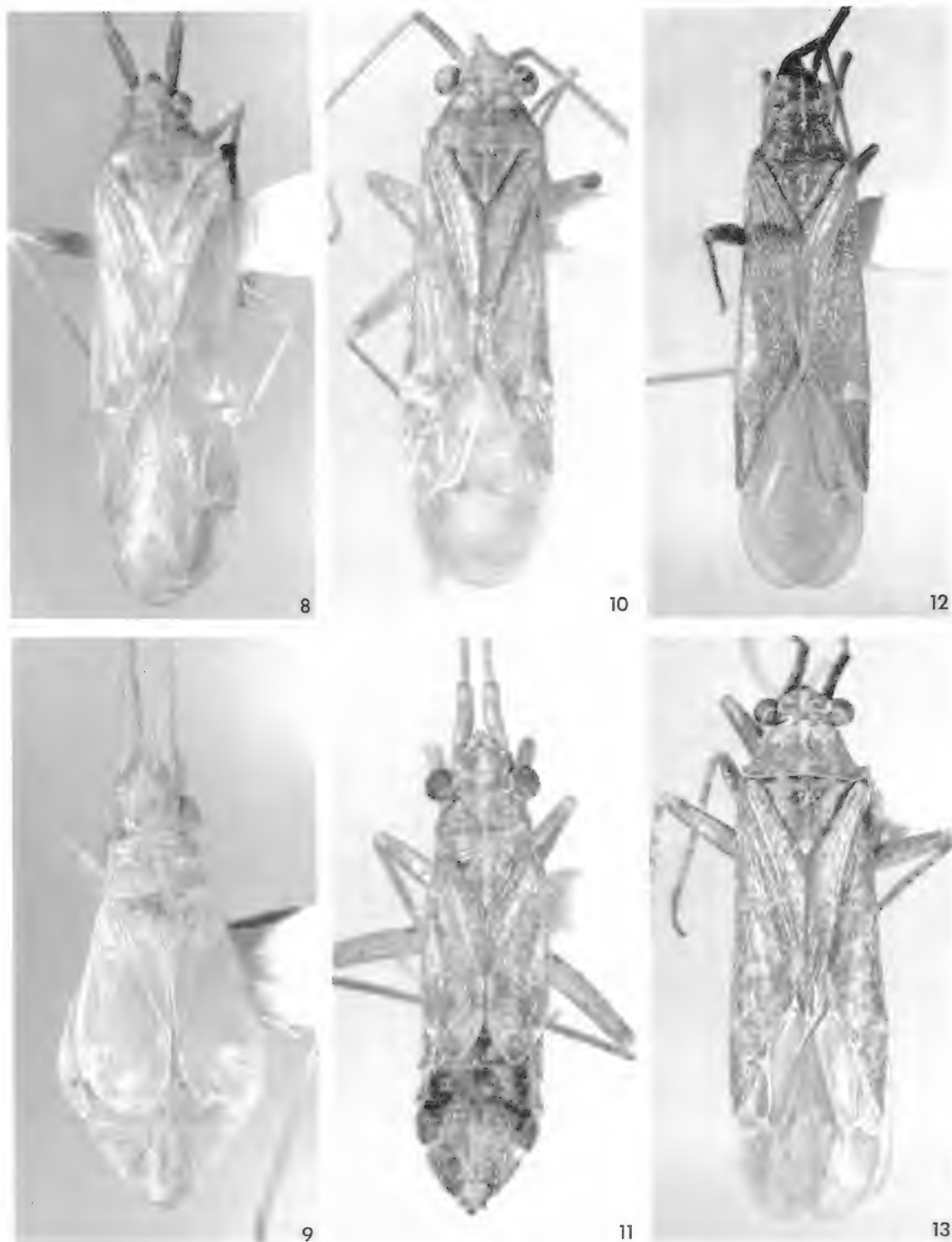
*Squamocoris utahensis* Knight

Figures 6, 7, 16, 20A–G

*Squamocoris utahensis* Knight, 1968, pp. 108–109, figure 140.

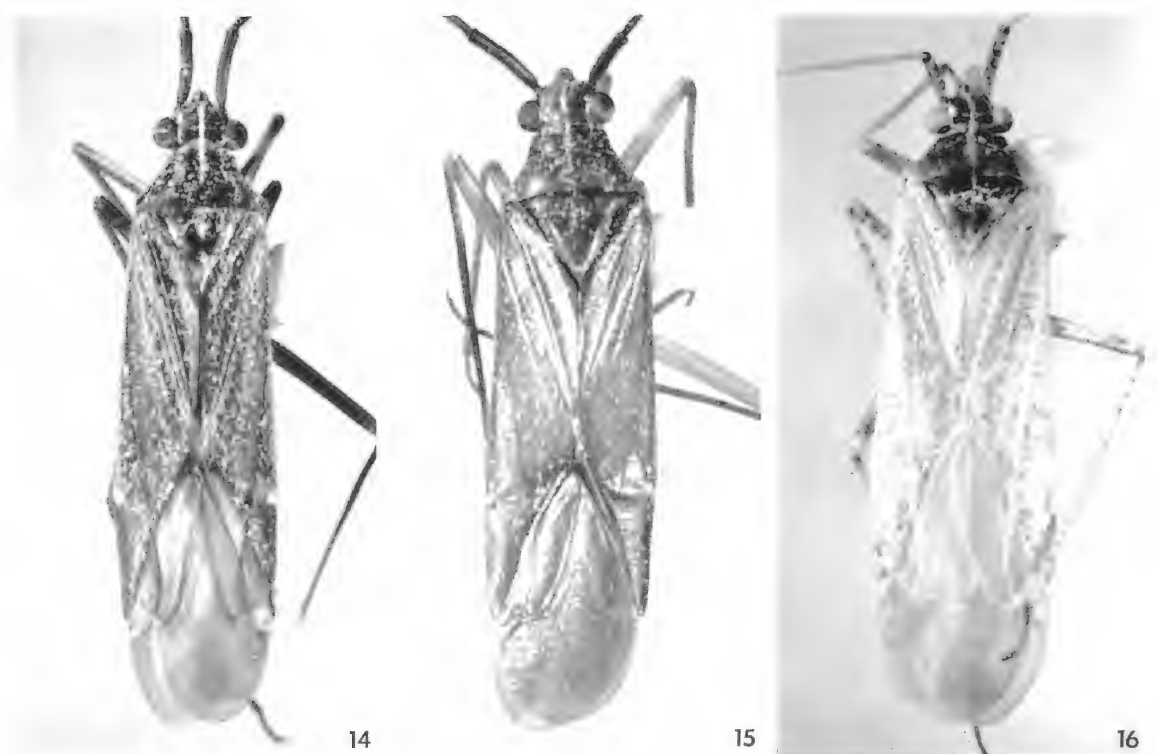
**DIAGNOSIS:** Recognized by the almost entirely darkened head, pronotum, and scutellum of the male; grayish white hemelytra with limited dark markings or suffusion; weakly carinate lateral margins of the pronotal disk; pale femora with large fuscous spots; and by the structure of the male genitalia (fig. 20A–G). Further distinguished from *arizonae* by the larger size, and female with hemelytra unnotched apically; distinguished from *fumosus*, *pallidinervus*, and *purshiae* by dark scalelike setae on dorsum and male with pale areolar veins.

**REDESCRIPTION: MALE.** Figure 16. Length 6.45–7.09; pale gray-brown general coloration; head, thorax, and underparts dark brown to nearly black; dorsal vestiture as in generic description, including broad dark scalelike setae and with some long dark bristlelike setae, short simple setae mostly pale; pronotum with five longitudinal lines of silvery white scalelike setae, reaching onto head and scutellum as described for *pallidinervus*, sometimes denuded. **HEAD.** Width across eyes 0.94–1.00, width of vertex 0.45–0.49; creamy white or pale yellow; vertex and frons mostly dark brown or black; basal half of tylus with sides and dorsomedial line also darkened; frons slightly convex, moderately sloping, with pale line medially; eyes occupying approximately three-fifths of head height; lower margin of antennal fossa at level of ventral margin of eye; antennae brown or brownish yellow, segments III and IV sometimes darker brown; length of segment I 0.85–0.93, slightly broader medially, pale dorsally and laterally with dark spots at insertions of bristlelike setae, ventral surface fuscous; length of segment II 2.09–2.31; labium reaching between mesocoxae or slightly beyond, sometimes between metacoxae. **PRONOTUM.** Posterior width 1.37–1.45; disk dark brown to nearly black, lateral margins and median line pale; lateral margins slightly car-



Figs. 8–13. Dorsal view of *Squamocoris* species. 8. *arizonae* ♂, California, San Bernardino Co., Goffs. 9. *arizonae* ♀, idem. 10. *schaffneri* ♂, holotype. 11. *schaffneri* ♀, from type locality. 12. *fumosus* ♂, holotype. 13. *latisquamus* ♂, holotype.





Figs. 14–16. Dorsal view of *Squamocoris* species. 14. *pallidinervus* ♂, holotype. 15. *purshiae* ♂, holotype. 16. *utahensis* ♂, Nevada, Elko Co., Utah State line on Rt. 30.

inate, weakly arcuate in dorsal view, posterior margin weakly sinuate; anterolateral angle strongly ridgelike; calli weakly convex, sometimes lightly marbled with brownish yellow, posterior margins moderately depressed, less so laterally; scutellum dark brown or black, apex and sometimes faint median line pale. **HEMELYTRA.** Creamy white or pale brownish yellow, lightly tinged with brown; claval and radial veins strongly elevated; membrane lightly suffused with fuscous, veins pale. **LEGS.** Femora creamy white or pale yellow with scattered fuscous spots, fore femora with fuscous longitudinal line medially on outer surface; tibiae pale with dark spots at spine bases; tibial spines dark brown; tarsi and apices of tibiae dark brown. **GENITALIA.** *Genital capsule:* apex truncate, left margin notched, right posterolateral margin with flattened, apically rounded process; left margin of capsule with elongate spinelike tubercle above base of paramere, right margin with much smaller knoblike tubercle above base of paramere. *Left para-*

*mere:* sensory lobe moderately produced, dorsal margin slightly convex near base; shaft expanded distally in dorsal view, excavated ventrally; apex angulate or narrowly rounded. *Right paramere:* short, spatulate, usually with single broad spine apically; dorsal surface of arm with two well-spaced inwardly directed broad serrations. *Vesica:* DS with three primary branches, each with serrate margins; medial branch bifurcate, right (upward directed) furcation narrow, with only one to several serrations distally; left (downward directed) furcation broader, with many marginal serrations. LS with two primary branches, left branch bifurcate, all branches with serrate margins.

**FEMALE.** Similar to male in color, vestiture, and structure, but head and pronotum less extensively darkened and with other characters given in generic description. Pronotum with dark markings mostly restricted to calli; scutellum more strongly convex distally, broadly pale laterally and apically; hemelytra short, strongly rounded laterally, usually

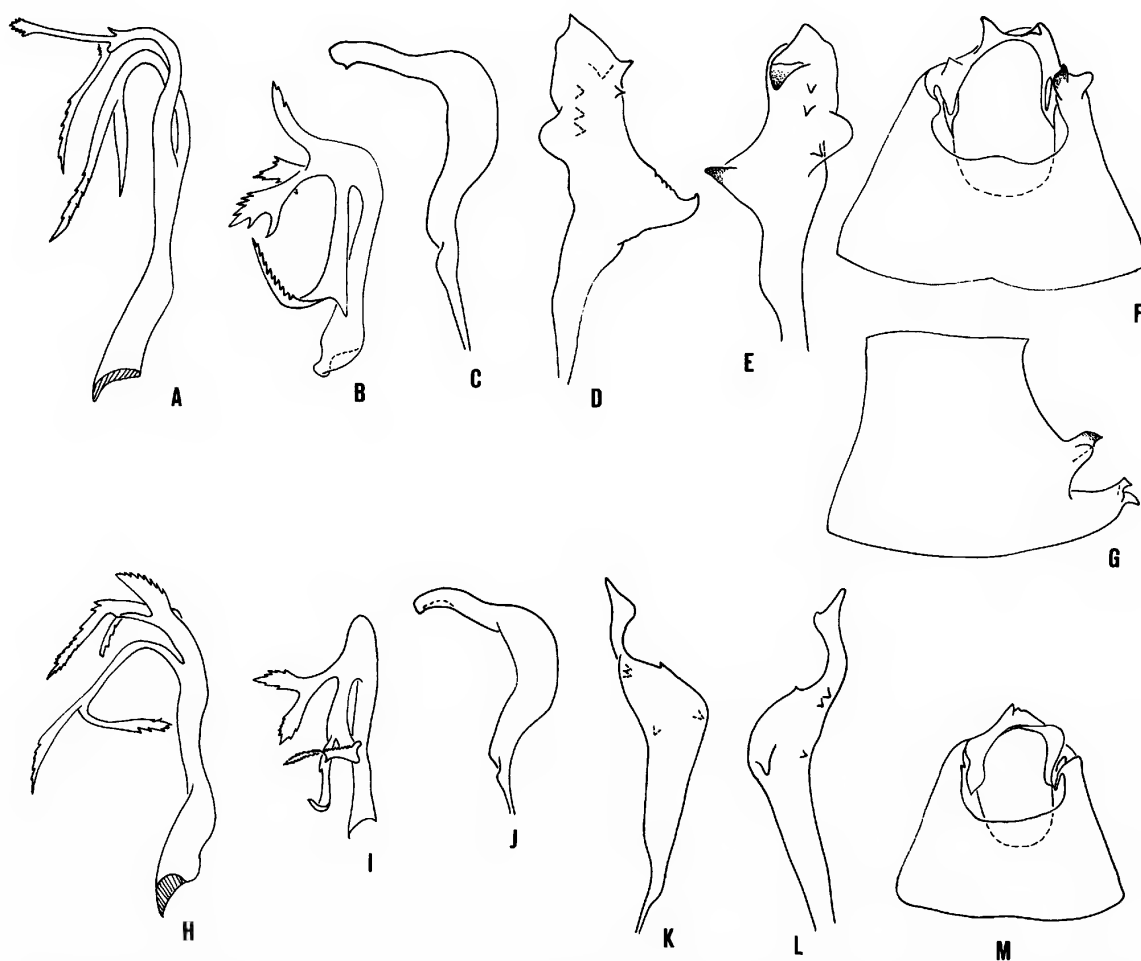


Fig. 17. Male genitalia of *Squamocoris* species. A–G. *arizonae*. A. Lateral spicula. B. Dorsal spicula. C. Left paramere. D. Right paramere, lateral view. E. Right paramere, dorsal view. F. Genital capsule, dorsal view. G. Genital capsule, lateral view. H–M. *schaffneri*. H. Lateral spicula. I. Dorsal spicula. J. Left paramere. K. Right paramere, lateral view. L. Right paramere, dorsal view. M. Genital capsule, dorsal view.

slightly convex dorsodistally, cuneal fracture and incisure moderately developed; cuneus short, apex subangulate. Length 3.08–3.26, width of pronotum 1.11–1.14; width of head across eyes 1.05–1.08, width of vertex 0.57–0.60; length of antennal segment I 0.92–0.98, segment II 2.19–2.28.

**DISTRIBUTION:** Figure 7. Known from east-central California, southern Idaho, northern and central Nevada, and northern and central Utah.

**DISCUSSION:** The host plant is *Sarcobatus vermiculatus* (Hook.) Torr. (Chenopodiaceae). Several males also were taken on *Artemisia tridentata* Nutt. (Asteraceae) and at light.

**SPECIMENS EXAMINED:** USA. **California.** *Mono Co.*: 1♀, 8 mi W of Nevada state line on Rt. 359, 2042 m, 2 July 1983, R. T. Schuh and M. D. Schwartz (AMNH). **Idaho.** *Twin Falls Co.*: 1♂, Hubbs Butte, 6 June 1931, "wind vane trap" (paratype, USNM). **Nevada:** *Carson City Co.*: 1♀, Carson City, 26 June 1929, E. P. Van Duzee (CAS). *Elko Co.*: 25♂, 36♀, 2 nymphs, Utah State line on Rt. 30, 1450 m, 25 June 1983, ex. *Sarcobatus vermiculatus*, R. T. Schuh and M. D. Schwartz (AMNH). *Humboldt Co.*: 1♂, Winnemucca, 1 June 1969, at UV light, T. R. Haig (CAF&A). *Lander Co.*: 1♀, 11 mi S of Rt. 50 on Rt. 376, T17N R44E, 1768 m, 28 June 1983, ex. *Sarcobatus vermiculatus*, R. T.



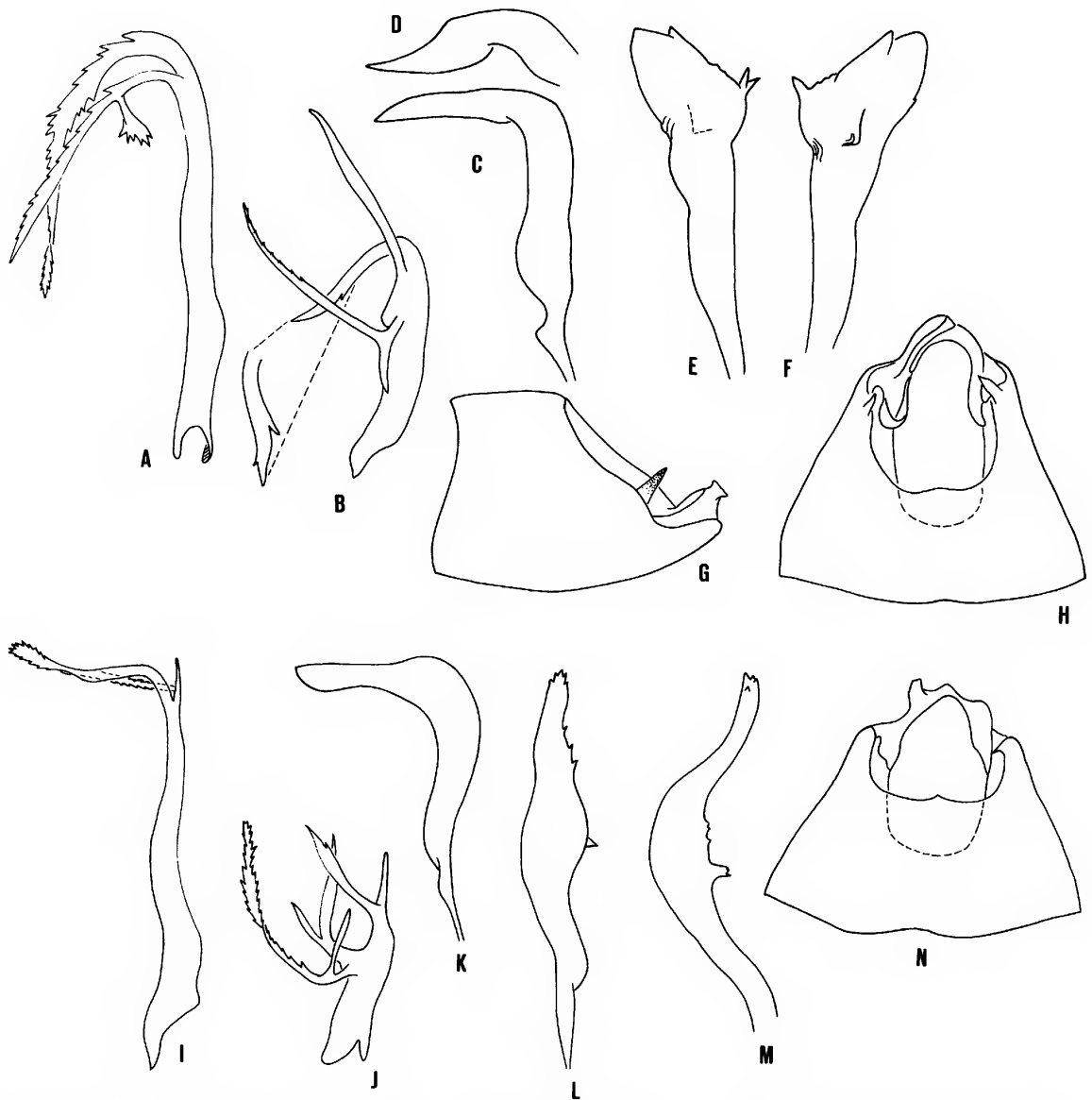


Fig. 18. Male genitalia of *Squamocoris* species. A-H. *fumosus*. A. Lateral spicula. B. Dorsal spicula. C. Left paramere. D. Left paramere, lateral view of shaft. E. Right paramere, lateral view. F. Right paramere, dorsal view. G. Genital capsule, lateral view. H. Genital capsule, dorsal view. I-N. *latisquamus*. I. Lateral spicula. J. Dorsal spicula. K. Left paramere. L. Right paramere, lateral view. M. Right paramere, dorsal view. N. Genital capsule, dorsal view.

Schuh and M. D. Schwartz (AMNH); 3♂ (at MV light), 1♀ (ex. *Artemisia tridentata*), Smith Crk. Valley, 9.5 mi S of Rt. 2, T15N R39E, 1920 m, 30 June 1983, R. T. Schuh and M. D. Schwartz (AMNH). Nye Co.: 4♂, Northumberland Cyn. Rd., Toquima Mts., T14N R44E Sec. 31, 1950 m, 28 June 1983, at MV light, R. T. Schuh and M. D. Schwartz

(AMNH); 1♂, 1♀, 5 mi W of Ichthyosaur St. Mon. on Rt. 844, 1935 m, 1 July 1983, ex. *Sarcobatus vermiculatus*, R. T. Schuh and M. D. Schwartz (AMNH); 1♀, 30 mi S of Rt. 50 on Rt. 376, T13N R41E, 1830 m, 30 June 1983, ex. *Sarcobatus vermiculatus*, R. T. Schuh and M. D. Schwartz (AMNH). Pershing Co.: 3♂, Woolsey Railroad Stn., 6 June

1973, at UV light, T. R. Haig (CAF&A). *Washoe Co.*: 1♂, 9 mi NW of Gerlach, 17 June 1966, "at night," W. Gagne (UCB); 4♂, 2♀, 2 mi E of Vya on Rt. 8A, 1750 m, 2 July 1979, ex. *Sarcobatus vermiculatus*, R. T. Schuh and B. M. Massie (AMNH). *Utah. Sevier Co.*: 1♂, Richfield, 3 July 1929, at light trap, E. W. Davis (holotype, USNM). *Uintah Co.*: 2♂, Bonanza, T9S R24E Sec. 23, 1525 m, 1 and 8 June 1981, ex. *Artemisia tridentata*, M. D. Schwartz (AMNH).

#### RAMENTOMIRIS, NEW GENUS

**DIAGNOSIS:** Closely resembling *Squamocoris* in body form, coloration, and vestiture (figs. 21–23), but distinguished by the much longer third antennal segment, unique fine structure of the scalelike setae (fig. 23), macropterous females, and structure of the male genitalia—especially the less highly branched spiculae of the vesica (fig. 25A–B, G–H) and genital capsule without sclerotized ridge or processes along right posterodorsal margin (fig. 25 F and L).

**DESCRIPTION:** MACROPTEROUS MALE. Length (tip of tylus to apices of hemelytra) 4.98–6.22; width across humeral angles of pronotum 1.31–1.51; brownish general coloration; surface texture finely granulate; dorsal vestiture with short, black, simple setae and appressed, silvery white, scalelike setae with strong converging ridges. **HEAD.** Very similar to *Squamocoris* with prominent tylus, weakly convex frons, ecarinate posterior margin, large eyes and antennal fossae (eye in lateral view occupying nearly entire head height), swollen lora, obsolete gula, and labium reaching between mesocoxae or slightly beyond. Genae very narrow, nearly obsolete; buccal cavity occupying entire ventral surface of head, flange extending nearly to level of middle of eye; antennae linear, inserted slightly below middle of eye, segment I distinctly thicker than segments II–IV, length about two-thirds of head width; segment III nearly twice as long as segment II; all segments with short, reclining, simple setae, segment I with several erect bristlelike setae on inner surface. **PRONOTUM.** Trapezoidal, much broader than long; lateral margins strongly arcuate, with weakly developed ridge anteriorly; posterior margin nearly straight

medially, broadly rounded laterally; calli moderately convex, broadly separated medially; mesoscutum broadly exposed; scutellum weakly arched, anteromedial region transversely flattened. **HEMELYTRA.** Elongate, nearly parallel-sided; claval and radial veins weakly elevated; cuneus longer than broad, incisure shallow, fracture distinct; membrane fuscous with scattered maculae and large mark bordering apex of cuneus, pale; membranal veins pale, inner cell elongate, narrowed posteriorly, outer cell triangular. **LEGS.** Pale with brown or fuscous markings; femora slightly flattened, narrowly rectangular, tapering slightly at each end; tibiae cylindrical, with dark spines; tarsal segment I about half as long as segments II and III; pretarsus with moderately curved claws, apically converging, lamellate parempodia, and small pulvilli covering about one-third of inner surface of claw. **GENITALIA.** *Genital capsule:* less triangular than for *Squamocoris* and more strongly notched at level of paramere sockets; without processes on right posterodorsal margin beyond paramere socket; aperture large, irregular, with hump on right anterior margin; lateral margins of aperture above paramere sockets without upright spines. *Left paramere:* somewhat C-shaped in dorsal view; sensory lobe weakly produced; shaft short, ventral surface notched distally, dorsodistal margin slightly deflexed; apex narrowly rounded. *Right paramere:* elongate, with angulate or rounded expanded region ventrally; anterior surface of expanded region excavated, inner margin weakly serrate; shaft gradually tapered, sometimes with small surface spines; apex rounded. *Phallosome:* broadly opened dorsally; left distal margin deeply incised. *Vesica:* ductus seminis and secondary gonopore as described for *Squamocoris*; two vesical spiculae (dorsal spicula, DS and lateral spicula, LS) with basal attachment to ductus as described for *Squamocoris*; DS short, with three or four branches, some or all with marginal serrations; LS longer, curved basally, unbranched, with marginal and sometimes surface serrations.

**FEMALE.** Macropterous. Similar to male in color, vestiture, and structure, except eyes slightly smaller resulting in broader genae and vertex, and hemelytra shorter and slightly

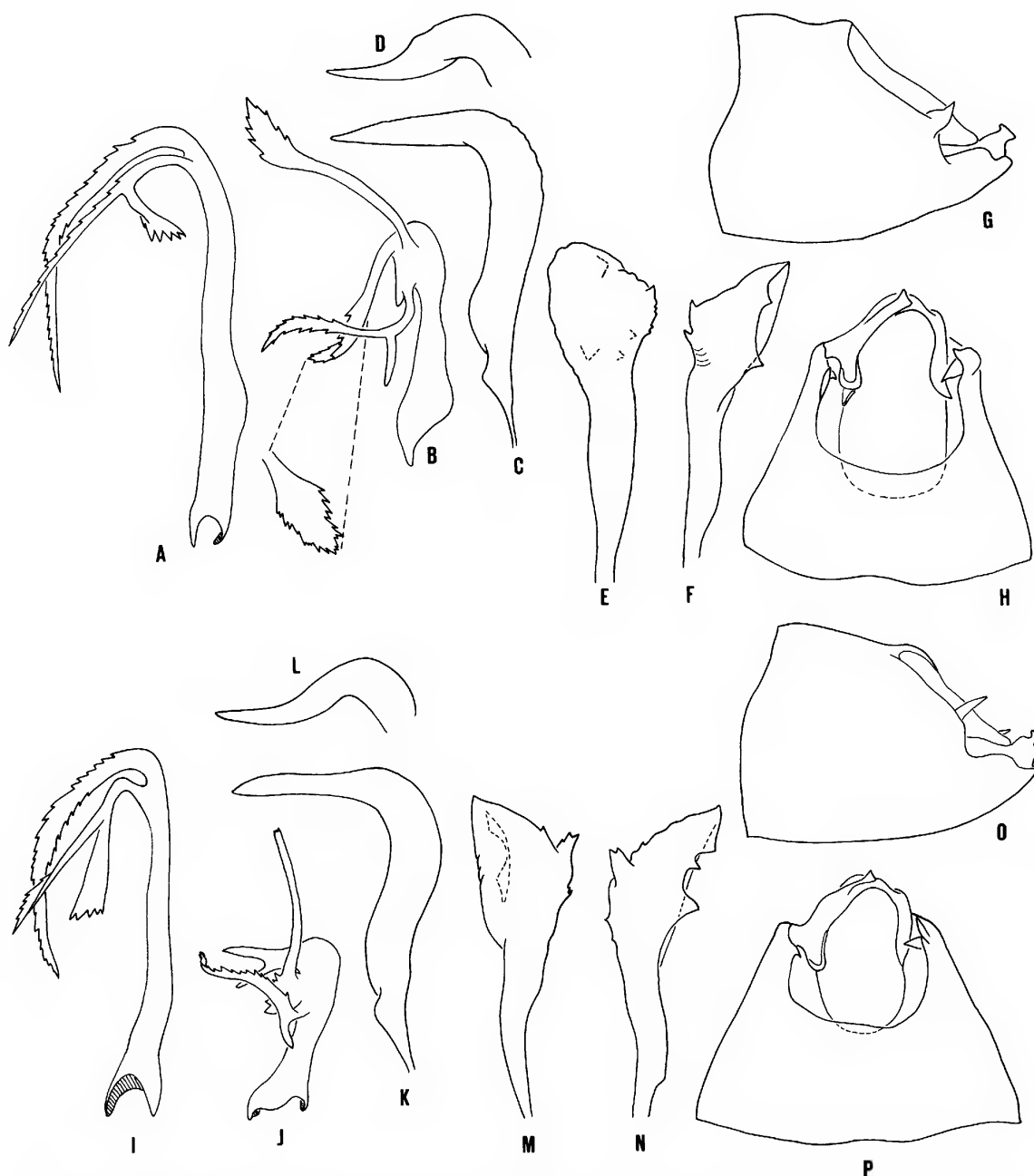


Fig. 19. Male genitalia of *Squamocoris* species. A–H. *pallidinervus*. A. Lateral spicula. B. Dorsal spicula. C. Left paramere. D. Left paramere, lateral view of shaft. E. Right paramere, lateral view. F. Right paramere, dorsal view. G. Genital capsule, lateral view. H. Genital capsule, dorsal view. I–P. *purshiae*. I. Lateral spicula. J. Dorsal spicula. K. Left paramere. L. Left paramere, lateral view of shaft. M. Right paramere, lateral view. N. Right paramere, dorsal view. O. Genital capsule, lateral view. P. Genital capsule, dorsal view.

rounded laterally. GENITALIA. Following terminology of Slater, 1950. *Sclerotized rings*: Large, widely separated, with strongly de-

veloped (more so than for *Squamocoris* spp.), ribbonlike posterior process curving downward and attached to ramus-body wall con-



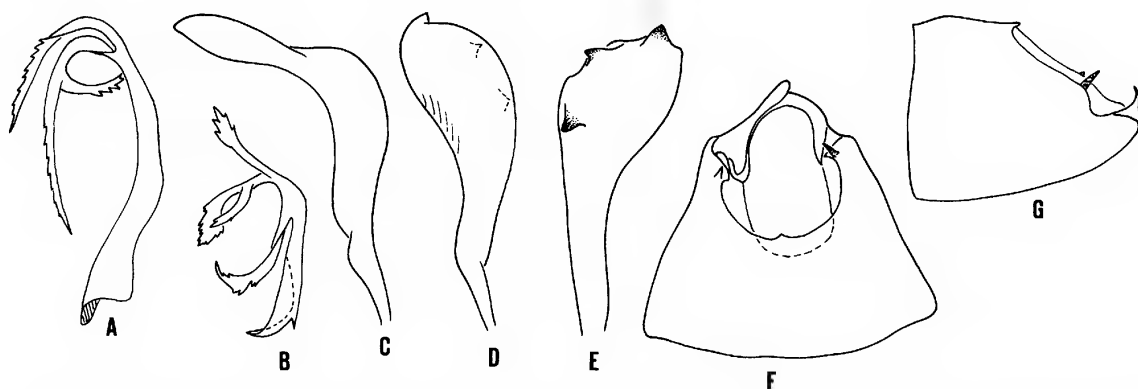


Fig. 20. Male genitalia of *Squamocoris utahensis*. A. Lateral spicula. B. Dorsal spicula. C. Left paramere. D. Right paramere, lateral view. E. Right paramere, dorsal view. F. Genital capsule, dorsal view. G. Genital capsule, lateral view.

nector; lateral margin of ring folded dorsally, not extending mesad; F and G structures weakly sclerotized, noticeably differentiated from surrounding membrane. *Posterior wall*: J structures large, weakly convex; K structures small, elongate, arising from mesal margins of J structures and strongly elevated above the latter, fused medially, strongly notched anteriorly; L structure large, produced dorsally, narrowly attached to antero-ventral surface of fused K structures.

**ETYMOLOGY:** From the Latin *ramentum* (loose scales) and *miris*, referring to the loosely attached scalelike setae of members of the genus; neuter.

**TYPE SPECIES:** *Ramentomiris baja*, new species.

**DISTRIBUTION:** Baja California, Mexico (fig. 7).

**DISCUSSION:** See Cladistic Analysis section for discussion of relationship to other orthotyline genera.

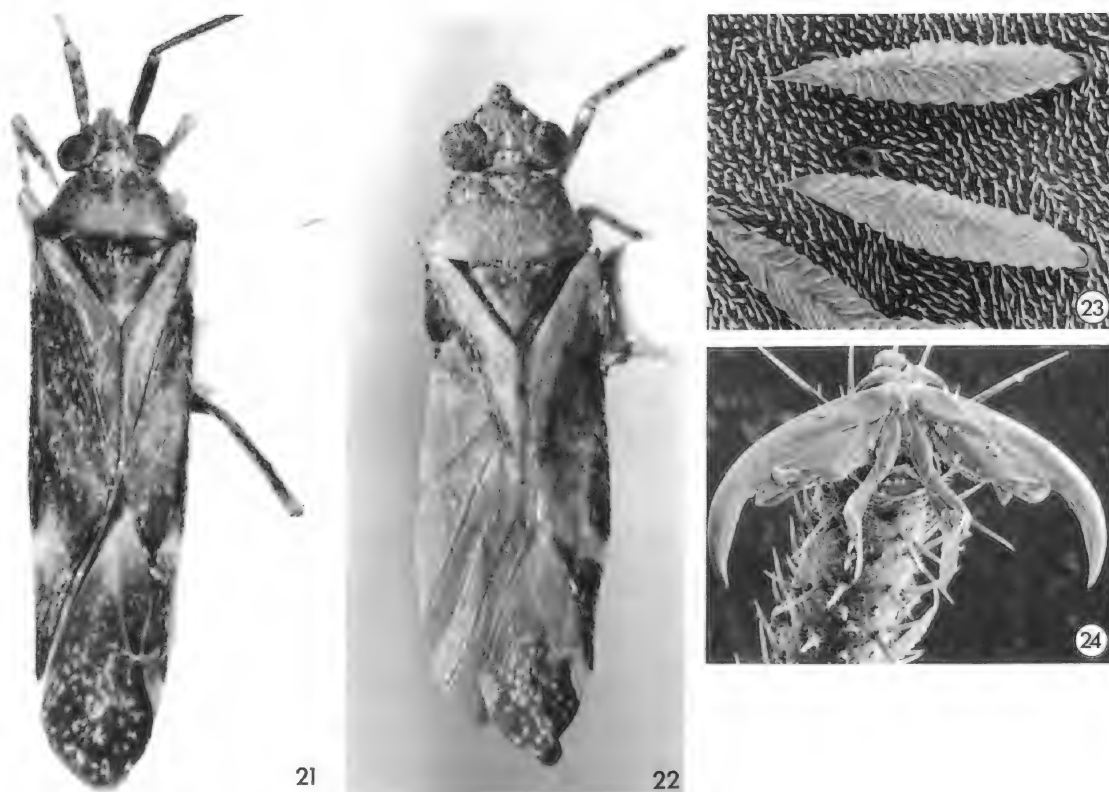
*Ramentomiris baja* was collected on *Prosopis* spp. (Fabaceae), which is the only known host association for the genus.

***Ramentomiris baja*, new species**

Figures 7, 21, 23, 24, 25A–F

**DIAGNOSIS:** Recognized by large size; dark brown general coloration; elongate cuneus (two times or more as long as broad); and by the structure of the male genitalia, especially the shape of the right paramere (fig. 25E) and spiculae of the vesica (fig. 25A–B).

**DESCRIPTION: MALE.** Figure 21. Length 6.14–6.22; dark brown general coloration; posterior lobe of pronotum, inner half of clavus, and base of cuneus sometimes grayish brown; dorsal vestiture as in generic description. **HEAD.** Width across eyes 1.00–1.05, width of vertex 0.33–0.35; pale with reddish brown markings on base of tylus and lora, and on basal margins of bucculae; vertex and frons extensively darkened with brown or fuscous; antennae dark brown, except segment I pale with fuscous spots dorsally; length of segment I, 0.70–0.71; II, 1.93–2.06; III, 3.35–3.50; IV, 1.08–1.12. **PRONOTUM.** Posterior width 1.51–1.52; grayish brown with lateral margins, posterior angles, and anterior lobe more extensive darkened with fuscous; markings on and between calli usually more reddish brown; propleura pale, basal half tinged with reddish brown or fuscous; scutellum moderately to extensively darkened with brown or fuscous but leaving apex pale. **HEMELYTRA.** Dark brown; inner half of clavus, posterolateral angle of corium, and base of cuneus usually paler brownish gray; membrane as in generic description. **LEGS.** Femora creamy white or pale yellow with large, fuscous spots; dorsal margin of hind femora mostly darkened; tibiae pale with dark spots at spine bases; tarsi, pretarsus, and apices of tibiae fuscous. **GENITALIA.** Figure 25A–F (see generic description for explanation). Right paramere with prominent, rounded ventral hump and short shaft (fig. 25E); dorsal spicula of vesica with three,



Figs. 21–24. *Ramentomiris* species. 21. Dorsal view of *baja* ♂, holotype. 22. Dorsal view of *loreto* ♂, holotype. 23. *baja*, scalelike setae on dorsum. 24. *baja*, frontal view of pretarsus.

strongly serrate branches (fig. 25B); lateral spicula with several rows of marginal and surface serrations distally (fig. 25A).

**FEMALE.** Similar to male in color, vestiture, and structure except for characters given in generic description. Length 5.66–5.96; width of pronotum 1.46–1.47; width of head across eyes 1.01–1.02; width of vertex 0.44–0.46; length of antennal segment I, 0.83–0.86; II, 2.24–2.39; III, 3.63–3.85; IV, 1.12–1.16.

**ETYMOLOGY:** Named for its occurrence in Baja California; a noun in apposition.

**DISTRIBUTION:** Figure 7.

**HOLOTYPE** ♂: MEXICO. **Baja California Norte:** 30.5 mi W of Bahia de los Angeles, 457 m (1500 ft), 23 April 1985, ex. *Prosopis glandulosa* Torrey (Fabaceae), R. T. Schuh and B. M. Massie; deposited in the American Museum of Natural History, New York.

**PARATYPES:** MEXICO. **Baja California Norte:** 2♂, 3♀, same data as holotype (AMNH); 1♀, Catavina, 19 June 1938, Michelbacher and Ross (CAS). **Baja California Sur:** 1♀, 106

mi N of La Paz on Rt. 1, 46 m (150 ft), 19 April 1985, ex. *Prosopis palmeri* S. Wats., R. T. Schuh and B. M. Massie (AMNH).

#### *Ramentomiris loreto*, new species

Figures 7, 22, 25G–L

**DIAGNOSIS:** Distinguished from *baja* by smaller size; grayish brown general coloration; short, broad cuneus (only 1.5 times as long as broad); and by the structure of the male genitalia, especially the large right paramere with less prominent ventral hump (fig. 25K) and dorsal spicula of vesica with four branches that have limited marginal serrations (fig. 25H).

**DESCRIPTION: MALE.** Figure 22. Length 4.98; grayish brown general coloration; dorsal vestiture as in generic description. **HEAD.** Width across eyes 0.97, width of vertex 0.32; yellowish brown; base of tylus, lower margin of lora, and margins of antennae fossae marked with fuscous; antennae dark brown,

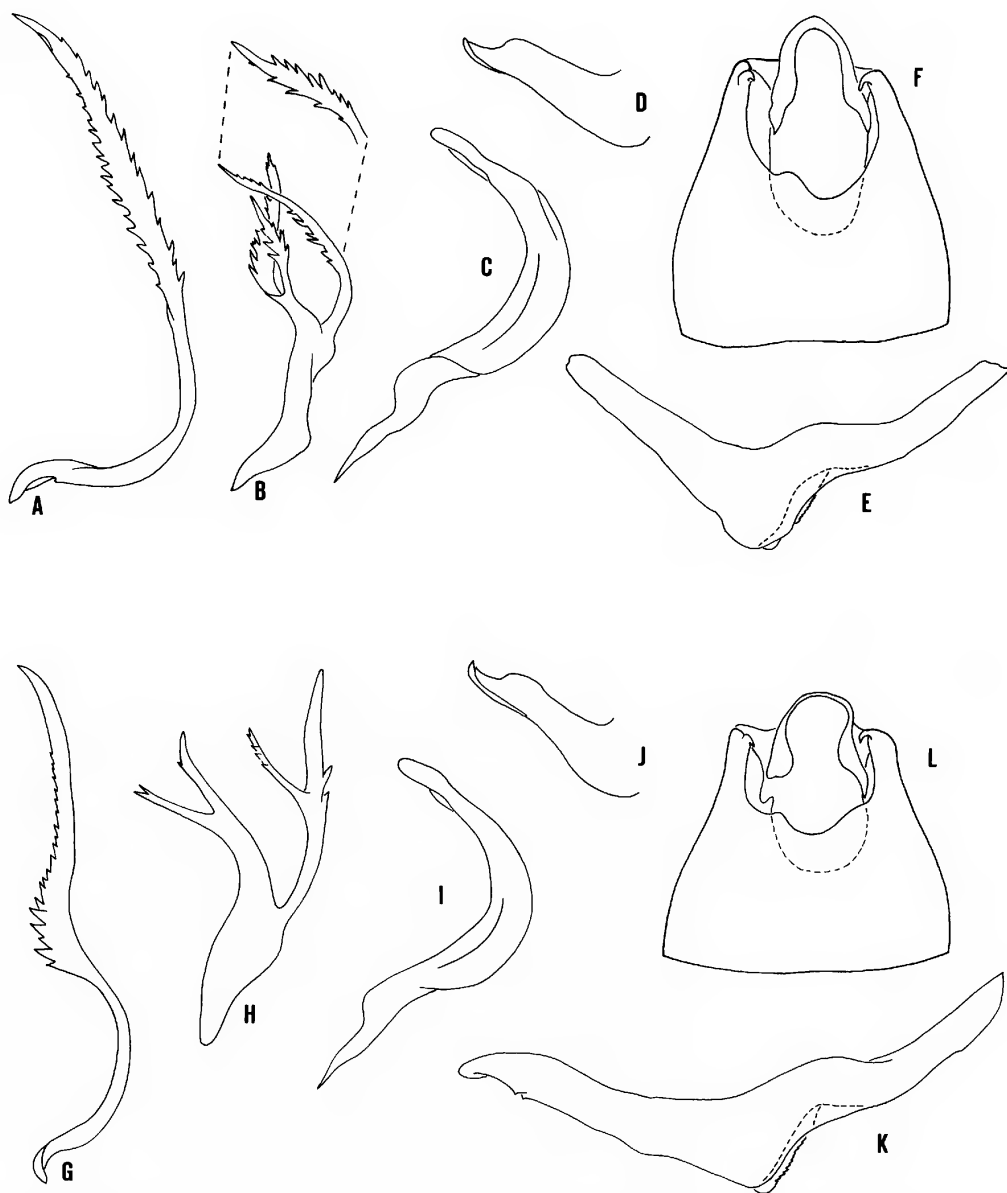


Fig. 25. Male genitalia of *Ramentomiris* species. A–F. *baja*. A. Lateral spicula. B. Dorsal spicula. C. Left paramere. D. Left paramere, lateral view of shaft. E. Right paramere, lateral view. F. Genital capsule, dorsal view. G–L. *loreto*. G. Lateral spicula. H. Dorsal spicula. I. Left paramere. J. Left paramere, lateral view of shaft. K. Right paramere, lateral view. L. Genital capsule, dorsal view.

except segment I brownish yellow with fuscous spots dorsally; length of segment I, 0.76; II, 1.75; III, 3.00; IV, 1.00. PRONOTUM. Posterior width 1.31; anterior lobe, including calli, brownish yellow with limited, faint, reddish brown markings; posterior lobe uniformly grayish white; propleura pale with brownish tinge anteriorly; scutellum yellowish brown, slightly darker basally. HEME-

LYTRA. Grayish white ground color; clavus exterior to vein tinged with fuscous; corium and cuneus mostly dark brown, except narrow anterior region and posterolateral angle of corium, and anterolateral angle of cuneus pale; corium bordering anal ridge broadly brownish gray; membrane as in generic description. LEGS. Coloration as described for *baja*. GENITALIA. Figure 25G–L (see ge-



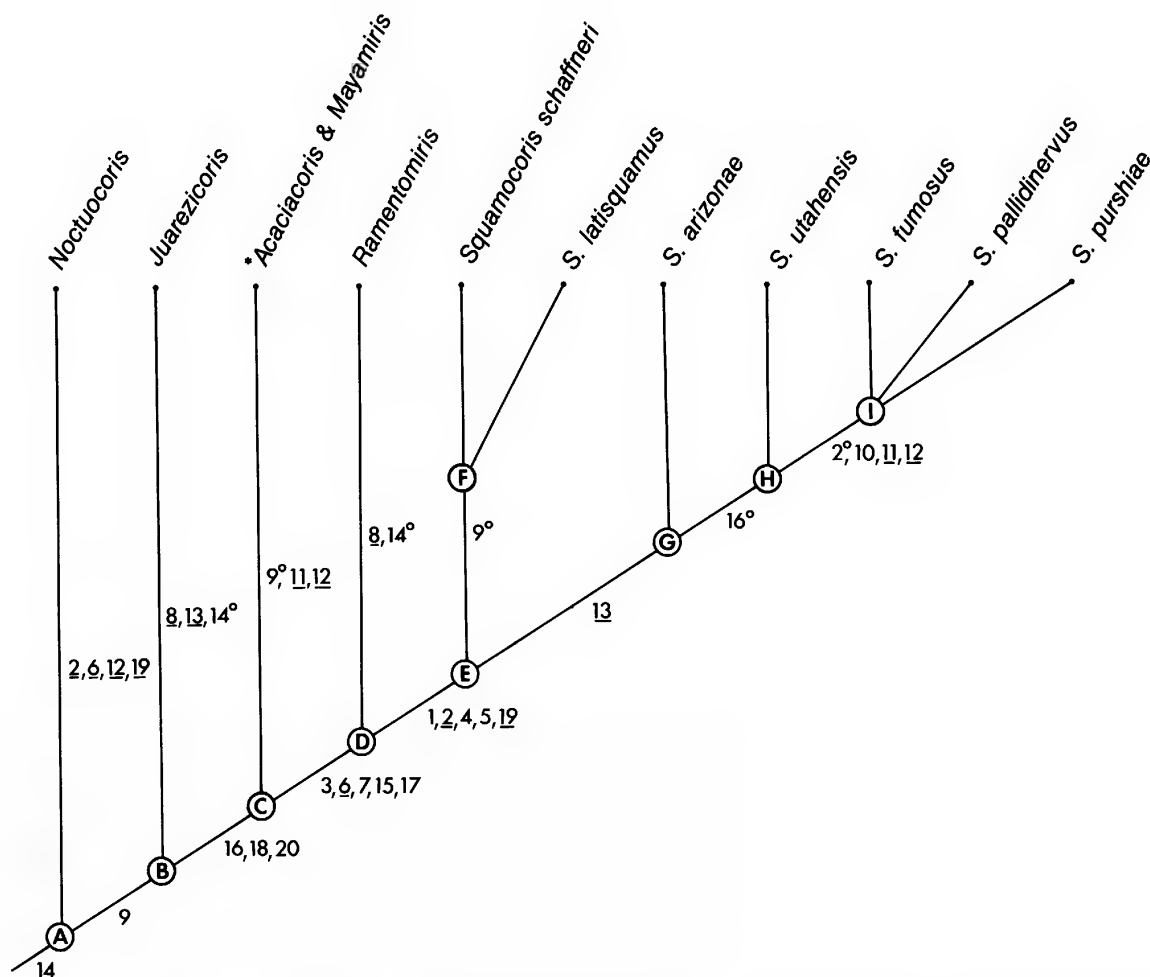


Fig. 26. Cladogram of *Squamocoris* species and five related genera of Orthotylini. Numbers are characters (reversals are indicated by a superscript zero; parallelisms are underlined); letters identify components discussed in text. \*Some *Acaciocoris* species have an upright tubercle associated with the dorsal margin of the left paramere socket (character 13).

neric description for explanation). Right paramere with less prominent ventral hump and longer shaft than for *baja* (fig. 25K); dorsal spicula of vesica with four, weakly serrate branches (fig. 25H); lateral spicula with a single, curved row of serrations (fig. 25G).

FEMALE. Unknown.

ETYMOLOGY: Named for the type locality; a noun in apposition.

DISTRIBUTION: Figure 7.

HOLOTYPE ♂: MEXICO. **Baja California Sur**: Loreto, 6 August 1975, W. and W. E. Savary and C. L. Mullinex; deposited in the California Academy of Sciences, San Francisco.

## CLADISTIC ANALYSIS

Knight (1968) did not discuss the relationship of *Squamocoris* to other orthotyline genera. In his key, *Squamocoris* is included in a group of genera recognized by the dorsal vestiture with sericeous or scalelike setae. Although considerably larger than indicated by Knight's study, the group of genera defined by scalelike setae does appear to represent a distinct lineage of Orthotylini, at least in North America. Stonedahl and Schwartz (1986) presented evidence suggesting that structural features of scalelike setae are useful for distinguishing more finite groups of or-

TABLE 1  
Description of Characters<sup>a</sup>

<b>Sexual Dimorphism</b>			12.	0(1)	legs uniformly pale, or pale with dark spots
1.	0(1)	not sexually dimorphic, female macropterous		1(3)	legs uniformly red, or dark brown to nearly black
	1(1)	sexually dimorphic, female strongly brachypterous			
<b>Vestiture</b>			<b>Male Genitalia</b>		
2.	0(2)	dorsum without dark brown or black scalelike setae	13.	0(1)	genital capsule without tubercle associated with paramere socket
	1(2)	dorsum with dark scalelike setae		1(2)	genital capsule with upright tubercle or spine associated with dorsal margin of paramere socket
3.	0(1)	scalelike setae narrow, nearly linear			
	1(1)	scalelike setae broad, subovate			
4.	0(1)	scalelike setae with converging, entire ridges	14.	0(3)	right posterodorsal margin of genital capsule simple, without sclerotized ridge or process(es)
	1(1)	scalelike setae with parallel ridges, sometimes breaking into pustules		1(1)	right posterodorsal margin of genital capsule modified, either with heavily sclerotized ridge, or with 1-3 spine-like or tuberculate process(es)
5.	0(1)	silvery white scalelike setae on pronotum and scutellum generally distributed			
	1(1)	silvery white scalelike setae on pronotum and scutellum at least partially arranged in longitudinal bands	15.	0(1)	left paramere with well-developed sensory lobe
<b>Head Structure</b>				1(1)	left paramere with obsolete or weakly-developed sensory lobe
6.	0(1)	lora not swollen	16.	0(2)	right paramere short, shaft appearing obsolete
	1(2)	lora swollen		1(1)	right paramere elongate, shaft well-developed
7.	0(1)	tylus weakly to moderately produced basally, rounded dorsally	17.	0(1)	right paramere without medial interior flange
	1(1)	tylus strongly and abruptly produced basally, sharply bent and nearly right-angled dorsally		1(1)	right paramere with weakly to moderately developed flange on inner medial surface, usually set off by spines or broad serrations
<b>Antennal Structure</b>			18.	0(1)	right paramere without spines or serrations on dorsal and/or inner surface(s) of arm
8.	0(1)	length of segment III equal to or less than length of segment II		1(1)	right paramere with spines or broad, strong serrations on dorsal and/or inner surface(s) of arm
	1(2)	length of segment III much greater than length of segment II	19.	0(1)	right basal margin of phallosome unnotched
<b>Body Structure and Color</b>				1(2)	right basal margin of phallosome notched
9.	0(3)	pronotum broadly rounded anterolaterally	20.	0(1)	origin of vesical spiculae on ductus seminis dorsal and right lateral of midline, base of lateral spicula larger
	1(1)	pronotum with rounded ridge or acuminate carina anterolaterally		1(1)	origin of vesical spiculae on ductus seminis dorsal and left lateral of midline, base of dorsal spicula larger
10.	0(1)	cuneal incisure and fracture of female noticeably developed			
	1(1)	cuneal incisure and fracture of female obsolete			
11.	0(1)	veins of hemelytral membrane light colored			
	1(2)	veins of hemelytral membrane dark colored			

<sup>a</sup> Numbers followed by a period are coded characters at top of table 2; numbers in second column are character states (0 = plesiomorphic state, 1 = apomorphic state; see body of table 2); numbers in parentheses indicate the number of origins of the character state on the cladogram.

thotyline Miridae. In the present paper, we use setal types, genitalic structures, and characters of the external morphology (particularly the head and antennae) to determine relationships between *Squamocoris* and what

we believe to be its nearest relatives. We also attempt to define relationships within the genus.

Our examination of North American Orthotylini identified five genera that appeared

TABLE 2  
Character Matrix for *Squamocoris* and Related Genera

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Squamocoris</i>																				
<i>arizonae</i>	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	1	1	1	1
<i>fumosus</i>	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1
<i>latisquamus</i>	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
<i>pallidinervus</i>	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1
<i>purshiae</i>	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1
<i>schaffneri</i>	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
<i>utahensis</i>	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	0	1	1	1	1
<i>Acaciacoris</i>	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0	1	0	1
<i>Juarezicoris</i>	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0
<i>Mayamiris</i>	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0	1	0	1
<i>Noctuocoris</i>	0	1	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	1	0
<i>Ramentomiris</i>	0	0	1	0	0	1	1	1	1	0	0	0	0	0	1	1	1	1	0	1

to be closely related to *Squamocoris*: *Acaciacoris* Schaffner (1977, Mexico), *Juarezicoris* Carvalho and Schaffner (1973, Mexico), *Mayamiris* Knight and Schaffner (1968, Mexico), *Noctuocoris* Knight (1923, North America), and *Ramentomiris* (new genus, Baja California). Within the group of Orthotylini defined by flattened scalelike setae, these six genera are united by the following characters: (1) length of antennal segment I usually exceeding width of vertex; (2) prominent tylus; (3) large antennal fossae; (4) phallosome broadly opened for nearly entire length; (5) genital capsule of male usually with sclerotized ridge and/or spinelike processes along right posterodorsal margin; and (6) vesica with two, distally branched, recurved, and usually strongly serrate spiculae.

Twenty characters of the external morphology and male genitalia indicate the relationships between *Squamocoris* and its near relatives. These characters are described in table 1 and their distribution among the taxa is given in table 2. Outgroup comparison included a variety of orthotyline taxa that possess scalelike setae (e.g., *Brooksetta inconspicua* (Uhler), *Dichaetocoris* spp., *Heterocordylus* spp., *Melanotrichus coagulatus* (Uhler), *Oaxacacoris* spp., *Parthenicus peregrinus* (Van Duzee), *Pseudopsallus* spp.). Selection of these taxa as likely outgroups and estimation of plesiomorphic character states was facilitated by information provided in Stonedahl and Schwartz (1986) regarding setal fine structure and characteristics of the

male genitalia. The examined outgroups received the 0 state for the majority of external characters. However, some variation in the character states of outgroup taxa occurred for external characters 1, 4, 11, 12, and most characters of the male genitalia (13–20). The cladistic analysis was performed by hand and the resulting networks rooted at *Noctuocoris*.

The results of the cladistic analysis revealed two minimum length trees of 34 steps differing only in the distribution of character 9. The most resolved tree is shown in figure 26, in which character 9 defines component B, and is reversed at *Acaciacoris* + *Mayamiris* and at component F. A less resolved tree is produced if character 9 is placed at *Juarezicoris*, *Ramentomiris*, and component G (three origins of the apomorphic state). The following changes in tree topology result: (1) component A has stems leading to *Noctuocoris*, *Juarezicoris*, and component C (component B collapsed with A); (2) component E has stems leading directly to *S. schaffneri* and *S. latisquamus* (component F collapsed with E). We have illustrated the most dichotomous tree in figure 26 because it conveys more information regarding relationships of the ingroup taxa.

*Squamocoris* is represented by component E on the cladogram and is defined by characters 1, 2, 4, 5, and 19 (see table 1 for description), of which characters 2 and 19 are homoplasious. The sister group of *Squamocoris* is the genus *Ramentomiris*. This relationship is described by component D on the



cladogram, which is defined by characters 3, 6, 7, 15, and 17. Only characters 2, 9–13, and 16 were useful for determining relationships among the seven species of *Squamocoris*.

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